TENSAI

Service Manual

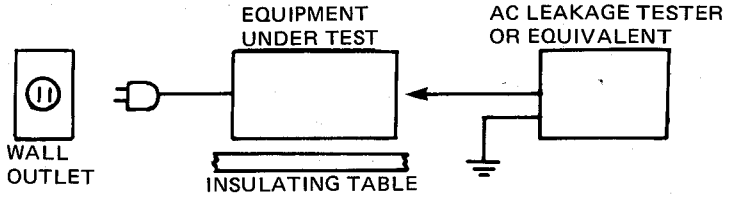
MODEL NO. TAD-30

COMPACT DISC
DIGITAL AUDIO PLAYER

■ TO SERVICE PERSONNEL

1. Critical Components Information.
   Components having special characteristics are marked ⚠ and must be replaced with parts having specifications equal to those originally installed.
2. Leakage Current Measurement (For 120V Model Only).
   When service has been completed, it is imperative that you verify that all exposed conductive surfaces are properly insulated from supply circuits.

- Meter impedance should be equivalent to 1500 ohm shunted by 0.15μF.
- Leakage current must not exceed 0.5mA.
- Be sure to test for leakage with the AC plug in both polarities.



- **CAUTION**

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED IN THE MANUAL MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

THE COMPACT DISC PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.

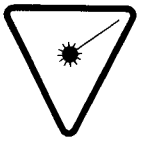
WARNING
TO PREVENT FIRE OR SHOCK HAZARD. DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE

LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.

"CAUTION–USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURE OTHER THAN SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE."

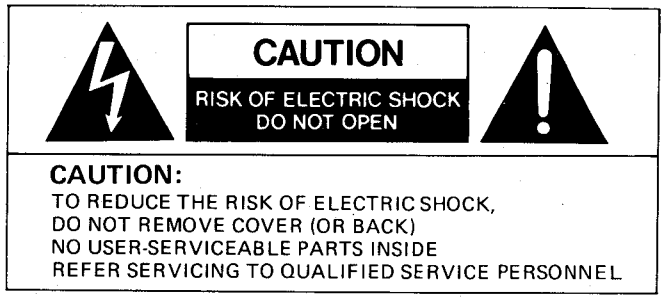
DANGER: INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.



CAUTION: HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED

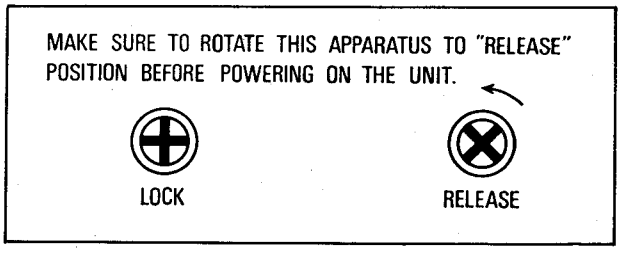
ATTENTION: RAYONNEMENT LASER DANGEREUX SI OUVERT AVEC L ENCLENCHEMENT DE SECURITE ANNULE.

CLASS 1
LASER PRODUCT


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



GENERAL SPECIFICATIONS

Digital audio disc (Compact disc) player

A. Controls

1)	Power	: Push
2)	Open/close	: Push (cyclic)
3)	Play/pause	: Push (cyclic)
4)	Stop	: Push
5)	Fast forward	: Push
6)	Fast backward	: Push
7)	Music (track) search	: 2-push (up/down)
8)	Repeat/Memory	: Push (off/memory/one/all/A-B cyclic)
9)	Program store	: Push
10)	Program cancel	: Push
11)	Display select	: Push (cyclic)

B. Indicators

1)	Music/elapse time	: 4 dig. 7 seg. LED Green (10mm/7.6mm high)
2)	Play/pause	: LED/red (flash when pause)
3)	Memory	: LED/red
4)	Repeat (one)	: LED/red
5)	Repeat (all)	: LED/red
6)	Repeat (A-B)	: LED/red
7)	Power	: LED/red

C. System

1)	Pick up	: 3 beam laser pick up
2)	Error collection	: CIRC, Double error collection
3)	D/A converter	: High speed 16 bit linear
4)	Filter	: Digital filter/LC filter
5)	Disc loading	: Drawer type, horizontal loading
6)	Random memory	: Random program memory max 16 music

D. Terminals

1)	Output	: 2-Plug with wire
2)	AC input	: SPT-1 cord (black) with 2 pin plug

E. Mechanical

1)	Dimension	: 350(W) x 80(H) x 295.5(D)
2)	Weight	: 3.3Kg

F. Others

1)	Power supply	: AC 120V, 60Hz (US, CA) 220V, 50Hz (E) 240V, 50Hz (UK, AUS) 100V, 60Hz (J)
2)	Power dissipation	: 10W
3)	Regurations	: UL1270, CSA, FCC

PERFORMANCE SPECIFICATIONS

Digital audio disc (Compact disc) player

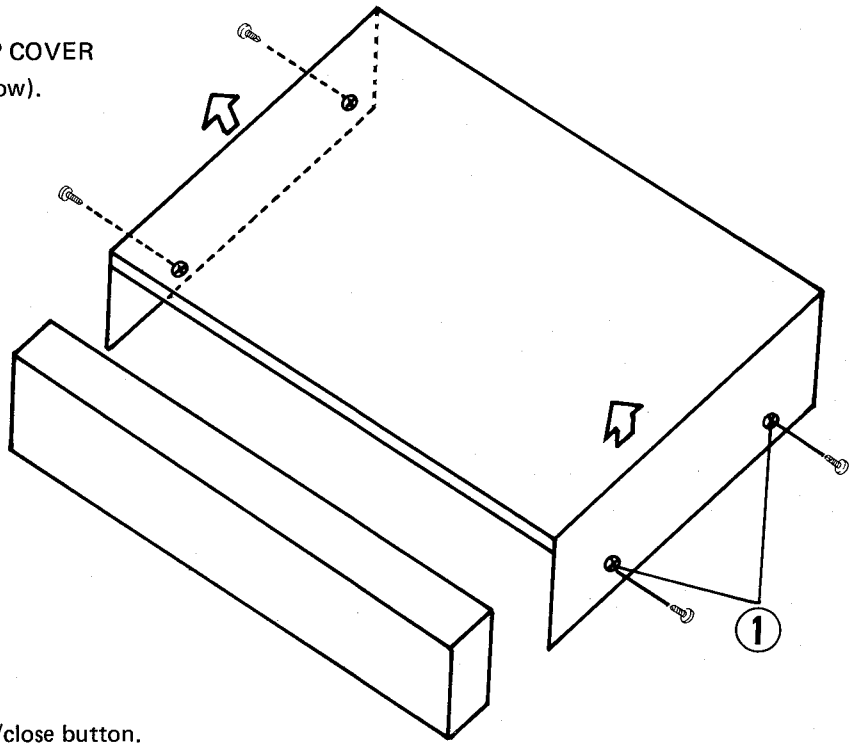
	Item		Unit	Nominal	Limit	Condition
1.	S/N ratio		dB	92	>80	Flat
			dB	96	>84	JIS A
2.	Channel separation 1K		dB	86	>70	BPF
3.	Channel balance 1K		dB	–	>2	
4.	Frequency response 20Hz to 18KHz		dB	–	+1/–4	0dB = 1 KHz
5.	De-emphasis	1K	dB	–0.37	+/–1	
		5K	dB	–4.53	+/–2.5	
		16K	dB	–9.04	+/–2.5	
6.	Harmonic distortion 1K		%	0.03	0.06	30KHz LPF
7.	Output voltage 1K		V	2.0	+/–0.4	
8.	FF/FB mute level		dB	–12	–	
9.	Wow & flutter		%	–	–	

- All items are measured w/o pre-emphasis unless otherwise specified.
- Test disc : SONY YEDS-7 disc or equivalent.
- Load impedance : 100K ohm/ch.
- Power supply : AC 120V +/–2%, 60Hz. (US, CA)
  220V +/–2%, 50Hz. (E)
  240V +/2 2%, 50Hz. (UK, AUS)
  100V +/–2%, 60Hz (J)

DISASSEMBLY INSTRUCTIONS

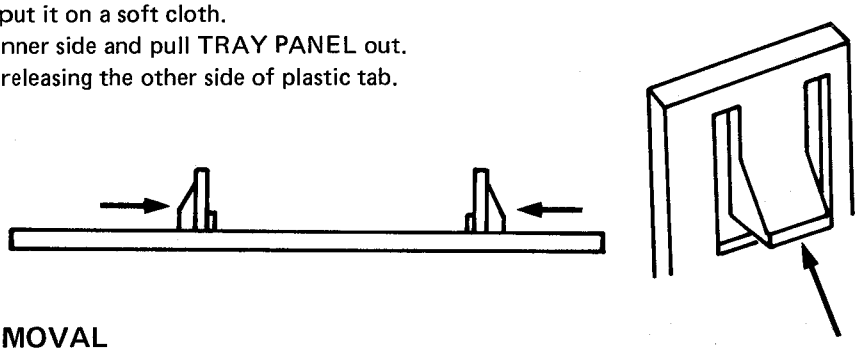
1. TOP COVER REMOVAL

Remove Screws ① (4 pcs) from the TOP COVER and lift it up (in the direction of the arrow).



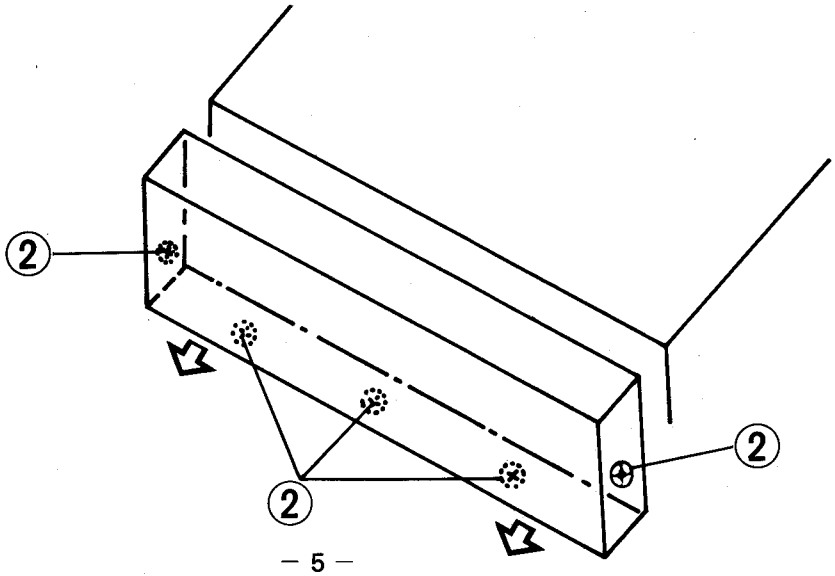
2. TRAY PANEL REMOVAL

(1) Open the tray by pressing the open/close button.
(2) Turn unit over and put it on a soft cloth.
(3) Push plastic tab to inner side and pull TRAY PANEL out.
(4) Repeat step (3) for releasing the other side of plastic tab.



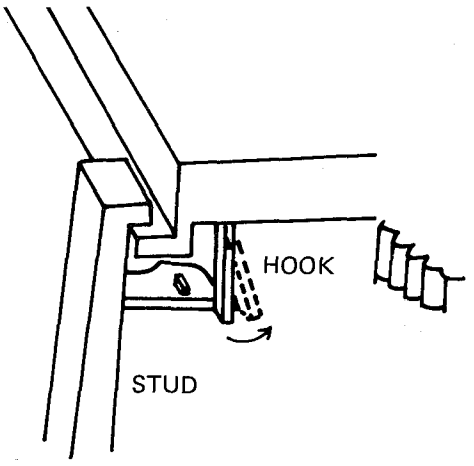
3. FRONT PANEL REMOVAL

(1) Following procedures of TOP COVER REMOVAL and TOP PANEL REMOVAL.
(2) Remove screws ② (5 pcs) from the FRONT PANEL.
(3) Pull FRONT PANEL out. (in the direction of arrow).



4. DISC TRAY REMOVAL

(1) Following procedures of TOP COVER REMOVAL.
(2) Open the tray by pressing the open/close button.
(3) Release hook of tray from the rail and pull tray out.

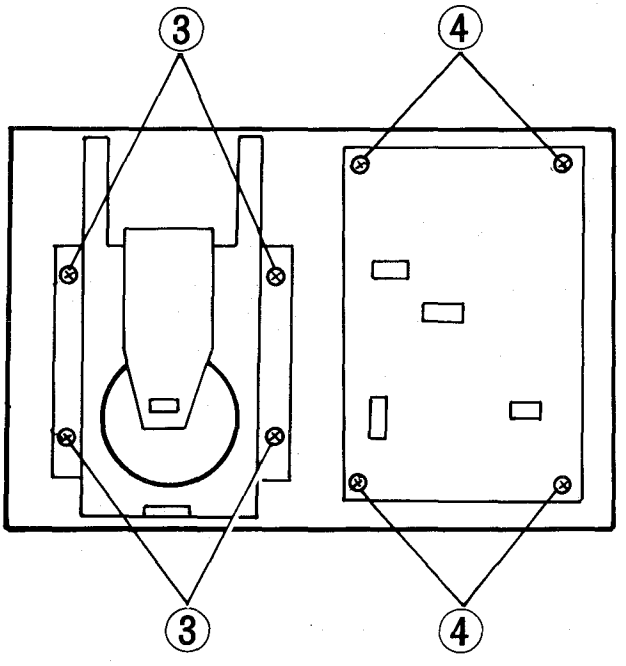


5. CD DECK PORTION REMOVAL

(1) Following procedures of TOP COVER REMOVAL and TRAY PANEL REMOVAL.
(2) Remove screw ③ (4 pcs) from the CD DECK.
(3) Remove Connector (4 pcs) from the MAIN PCB.
(4) Pull CD DECK out carefully.

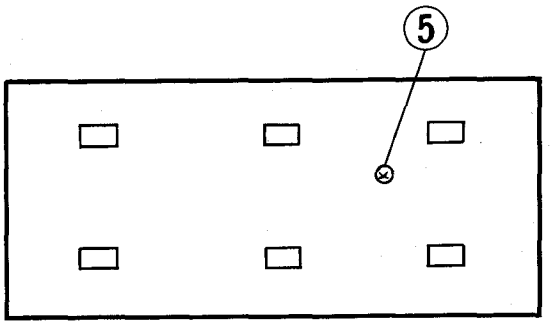
6. MAIN PCB REMOVAL

(1) Following procedure of TOP COVER REMOVAL.
(2) Remove screw ④ (4 pcs) and connectors.
(3) Pull MAIN PCB out carefully.



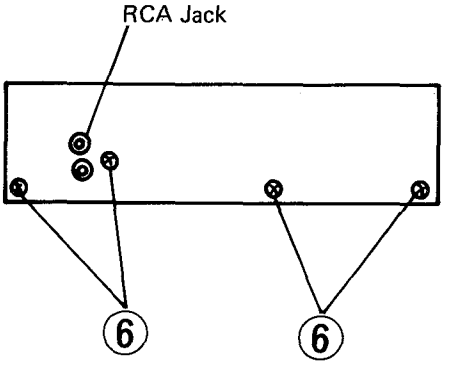
7. CONTROL PCB REMOVAL

(1) Following procedure of TOP COVER REMOVAL.
(2) Remove screws ⑤ (1 pcs) from the CONTROL PCB.
(3) Release plastic tab (6 pcs) and pull CONTROL PCB out carefully.

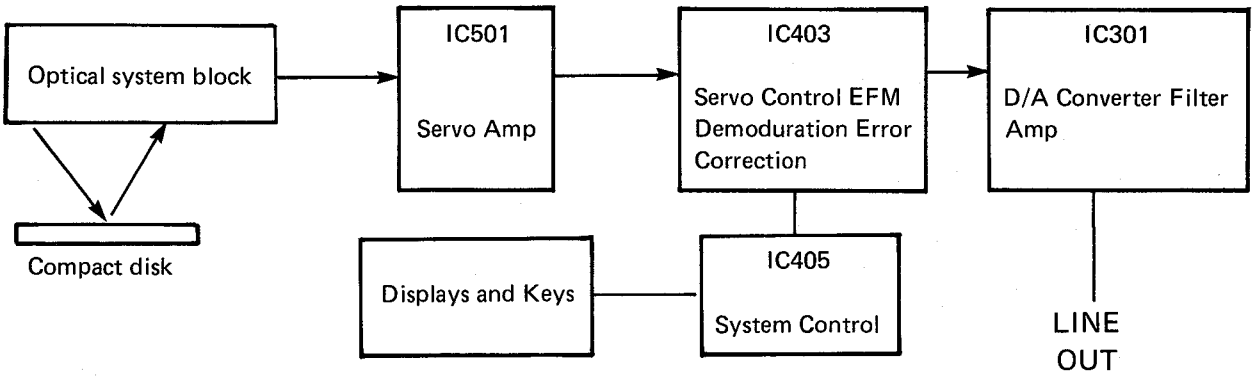


8. BACK LID REMOVAL

(1) Following procedure of TOP COVER REMOVAL.
(2) Remove screws ⑥ (4 pcs) and pull BACK LID out.



CIRCUIT DESCRIPTION



This unit is configured as shown in the block diagram above.
The IC403 is the heart of the circuitry, and the IC405 is the man/machine interface e.g. upon pressing the PLAY button it enters the routine for activating the Play Mode, sending the Play command to the IC403 and entering the Play Mode A compact audio disc stores musical information in digital form.
This information is read back from the disc by a laser beam. Variation in the beam reflected from the disc is then converted into analog signals.
Below discuss how the information on the disc is converted into the original audio signal.
The variation in reflection of the laser beam are read as variations in the current by the photo diode in the pick-up section (by using the characteristics of the photo diode and that the current changes according to the amount of the light falling on to it), and then converted into a current signal. This current signal is added to the IC501 together with signals containing tracking and focus error, if detected by the photodiode.
These signals are then amplified by the IC501 and output to the terminal 26.
These signals, called EFM signal, contain not only musical information but also a sync signal, information on time and address called Q data, and CRC check signal.

The signal are then applied to the IC403, where they are immediately stored in the RAM. Next, they are, when read back from the RAM, further divided into individual units of original information, being checked for data errors through the cyclic redundancy check. Any erroneous data is thus rewritten. Of these unit of information only the musical information is sent to the D/A converter, IC301, which converts 16-bit data input in 2's complement form to an analog signal containing 13-bit mantissa with 7-bit exponent which are proportional to the input digital signal. The analog signal thus generated by the D/A converter is then sent to a sample and hold circuit that is an analog switch built in the IC301, before being added to the low pass filter.

Music recorded on the disc is thus played by repeating the above sequences for the left and right channels alternately.

ADJUSTMENT PROCEDURE

OSCILLO SCOPE SETTING

TIME	0.5 μsec/div.
VOLT	50mV/div.
INPUT	AC
MODE	AUTO
PROBE	10:1

1. Skew Angle Adjustment

*The following procedures are to be required only after replacing the pick-up.

1) Open disc tray by pressing OPEN/CLOSE button.
2) Load test disc (SONY YEDS-18) and play 70-80 track.
3) Observing 4th pin of TP2 on the oscilloscope. Adjust the skew adjustment screw until the jitter meter shows the minimum level. When the proper level is obtained. Apply thread adhesive to the screw.

When the jitter meter is not used:

4) Observing 4th pin of TP2 on the oscilloscope. Adjust the skew adjustment screw until a clear trace of waveform pattern as shown in Fig. 2 appear on the oscilloscope. When the proper level is obtained. Apply thread adhesive to the screw.

2. Grating Adjustment

*The following procedures are to be required only after replacing the pick-up.

1) As shown in Fig. 3, connect 4P, 6P, 8P and clip of the tester to CN4, CN3, CN2, and C518 of the main PCB incorporated in the player, respectively.
2) Turn on the power to the CD player, and insert the test compact disc (SONY YEDS-18) (The disc will, then, not rotate)
3) Turn on the power to the tester (the test compact disc then rotates) and press SERVO SW ON.
4) While holding down the PLAY/PAUSE buttons on the CD Player, observe the waveforms of both CH1 and CH2 test points appearing on the oscilloscope, and, at the same time, adjust the grating adjustment screw of the pick-up (see Fig. 5) until the waveforms shown in Fig. 4 are observed.

Caution: During Step 4 PLAY/PAUSE button must be depressed and held down, or the laser will be turned off in 12 seconds.

5) Press SERVO SW once again to turn off. Observing the Lissajous patterns of tester CH1 and CH2, adjust the grating adjustment screw attached to the pick-up until the phase shift in CH1 and CH2 becomes 180 degrees *see Fig. 6).
   Make sure that the waveform observed in Step 4 above concurrently appears on the oscilloscope. If it does not, restart from Step 4.
6) When the proper level is obtained. Apply thread adhesive to the screw.

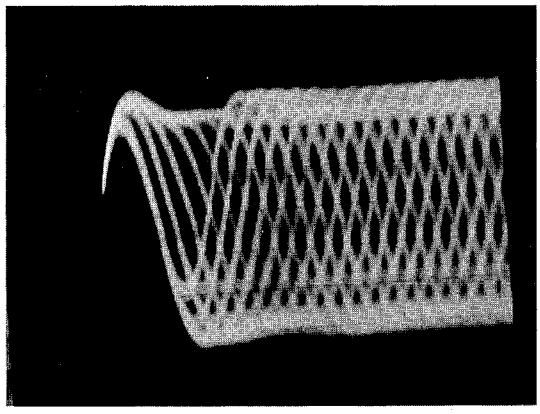


Fig. 2

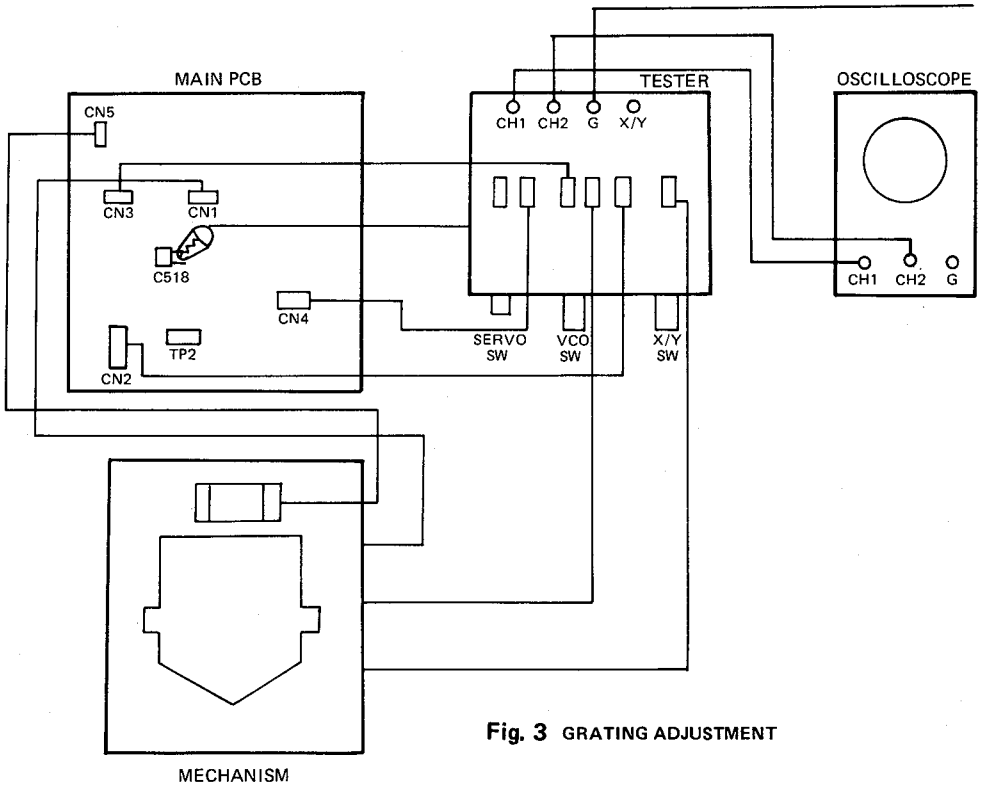


Fig. 3 GRATING ADJUSTMENT

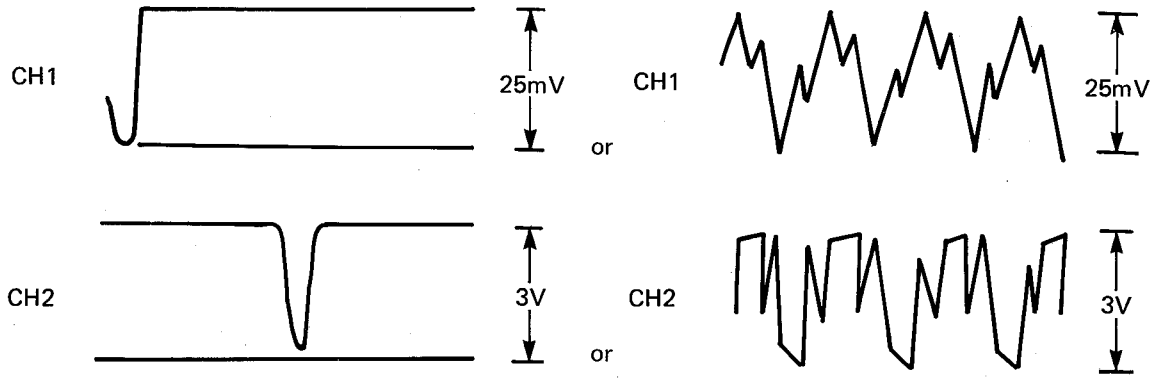


Fig. 4

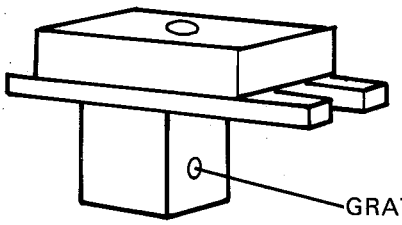


Fig. 5 PICK-UP

PHASE DIFFERENCES

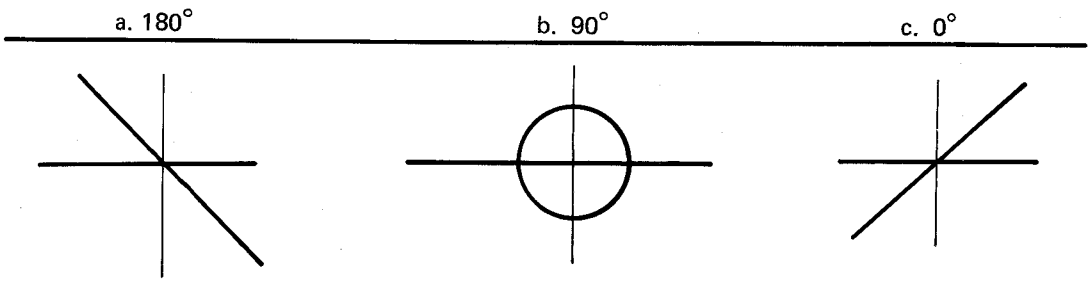


Fig. 6 ADJUSTMENT SHOULD BE MADE AS Fig. 6-a (CH1, CH2 LISSAJOUS PATTERN)

OSCILLOSCOPE SETTING

CH1		CH2	
PROBE	1:1	PROBE	10:1
TIME	5 μsec/div.	TIME	5 μsec/div.
VOLT	10 mV/div.	VOLT	1V/div.
INPUT	AC	INPUT	AC
IN TRIG	CH1	IN TRIG	CH1
MODE	AUTO	MODE	AUTO

3. VCO (Self-running oscillating frequency) Adjustment

1) Turn unit power on.
2) Connect 4th pin and 3rd pin (GND) of TP2 by short pin.
3) Observing 2nd pin of TP1 on the frequency counter. Adjust L401 until the frequency counter reading 4.3218MHz (4.3218-4.323).

4. EF Balance Adjustment

*The following procedures are required after replacing the pick-up

1) Connect lead of C518 (Lead which is Connected with pin 12 of IC501) to ground.
2) Load the test disc (SONY YEDS-18) and press the play button (and hold until adjustment is completed).
3) Observing 2nd pin of TP3 on the oscilloscope. Adjust SF505 until both positive and Negative peaks of the waveform becomes equal at 0V level.

5. SERVO GAIN ADJUSTMENT

5-1 Focus Gain Adjustment

1) Input a sine wave of 900Hz, 50mV rms to 1st pin and 2nd pin of TP2 (1st pin + 2nd pin −).
2) Load test disc (SONY YEDS-18) and playback track 1.
3) Observing 1st pin and 2nd pin on the VTVM. Adjust SF503 until both meter shows equal value.

5-2 Tracking Gain Adjustment

1) Input a sine wave of 1.2KHz, 50mV rms to 1st pin and 2nd pin of TP2 (1st pin + 2nd pin −).
2) Load test disc (SONY YEDS-18) and playback track 1.
3) Observing 1st pin and 2nd pin on the VTVM. Adjust SF504 until both meter shows equal value.

OSCILLOSCOPE SETTING

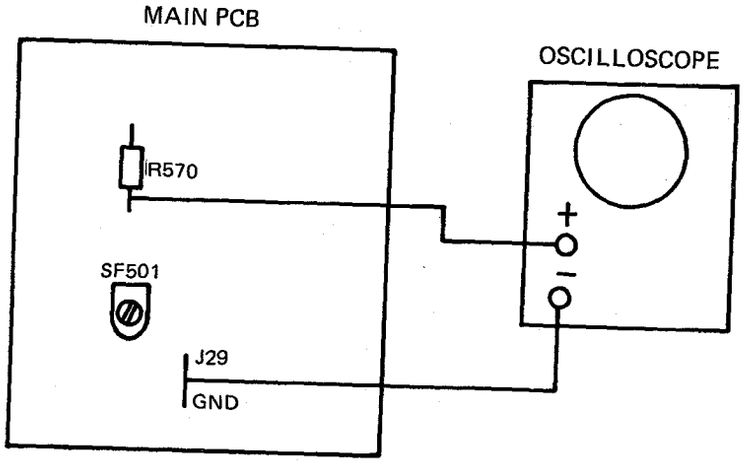
TIME	1m sec/div.
VOLT	5 mV/div.
INPUT	DC
PROBE	10:1

6. Offset Adjustment

The following procedures do not requir the tester.

6-1 Focus offset adjustment

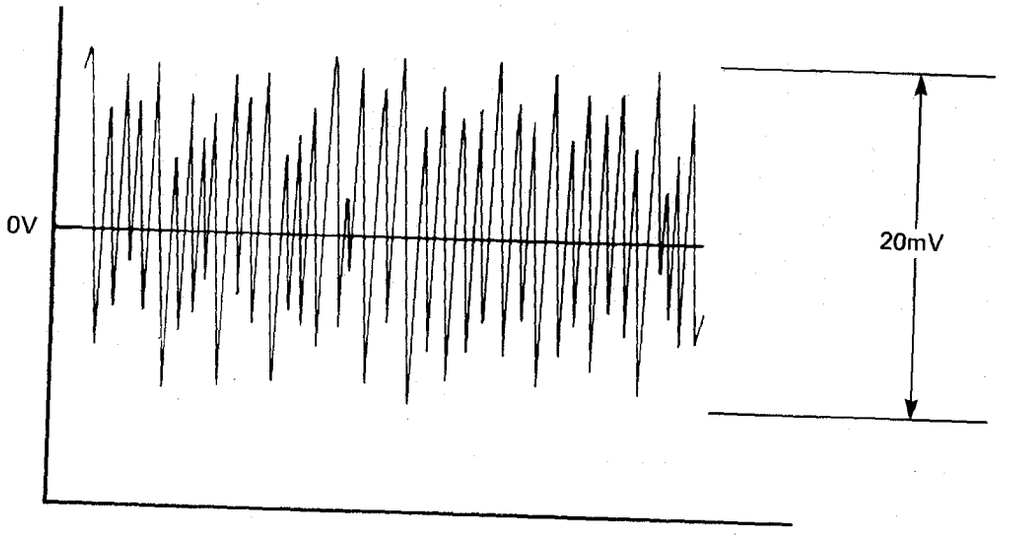
1) Turn on the power to the CD Player, and place the CD Player in the stop state.
2) Observing the waveform of test point R570 of the main PCB on the oscilloscope, adjust SF501 until the amplitude of the positive and negative peaks of the waveform becomes equal at 0V level.



OSCILLOSCOPE SETTING

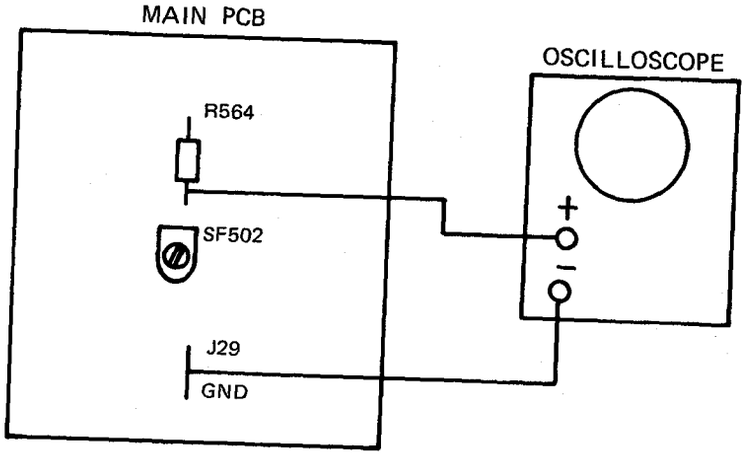
TIME	0.5 m sec/div.
VOLT	5 mV/div.
INPUT	DC
MODE	AUTO
PROBE	10:1

FOCUS OFFSET ADJUSTMENT



6-2 Tracking offset adjustment

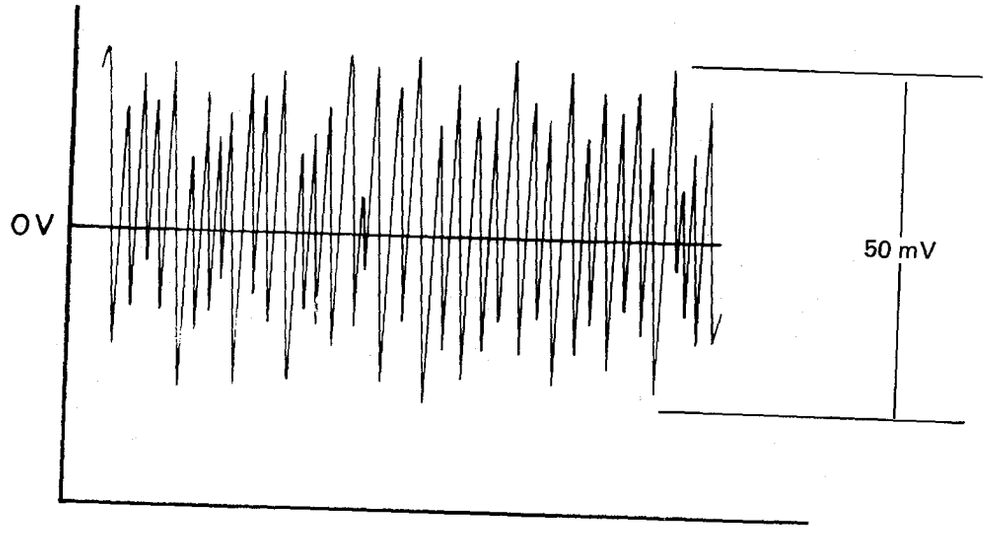
1) Turn on power to the CD Player, and place it in the stop state.
2) Observing the waveform of test point R564 on the main PCB, adjust SF502 until the amplitude of the positive and negative peaks of the waveform becomes equal at 0V level.



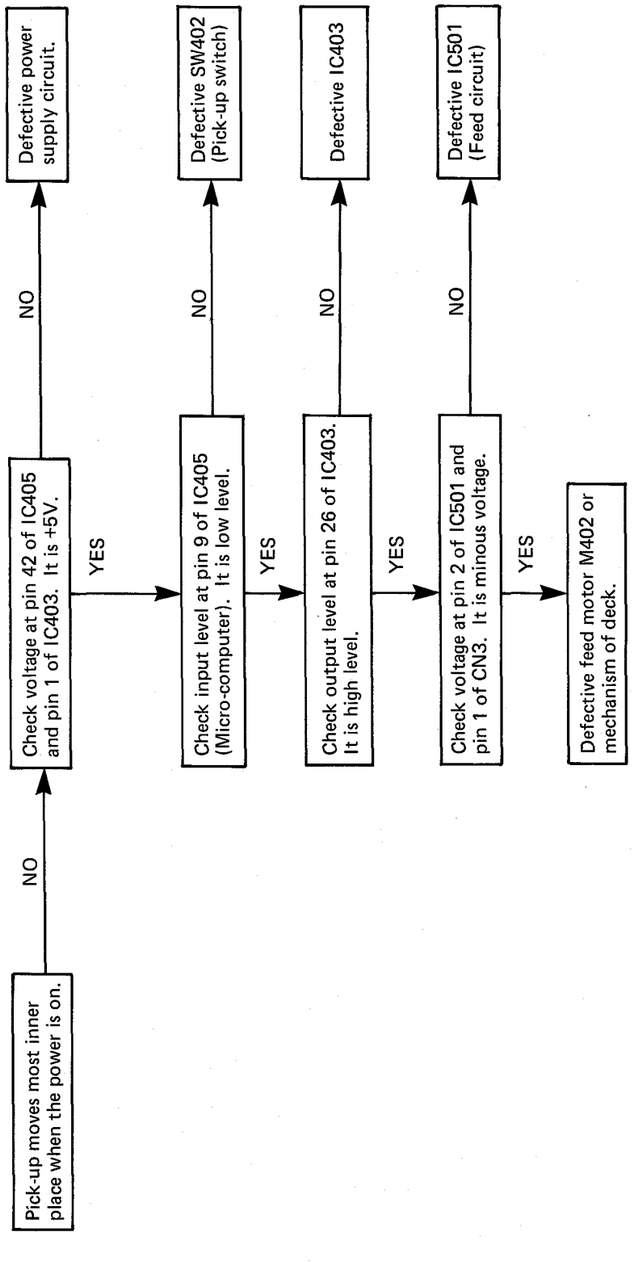
OSCILLOSCOPE SETTING

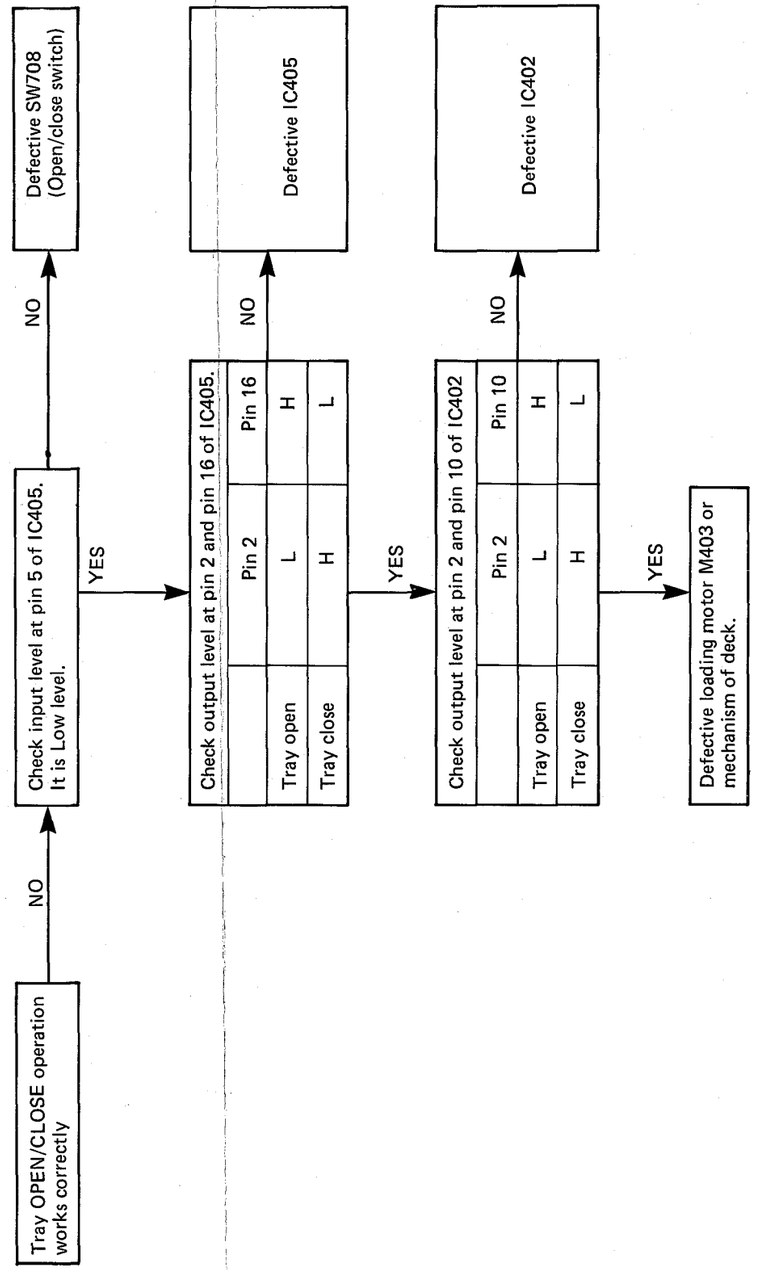
TIME	0.5 m sec/div.
VOLT	5 mV/div.
INPUT	DC
MODE	AUTO
PROBE	10:1

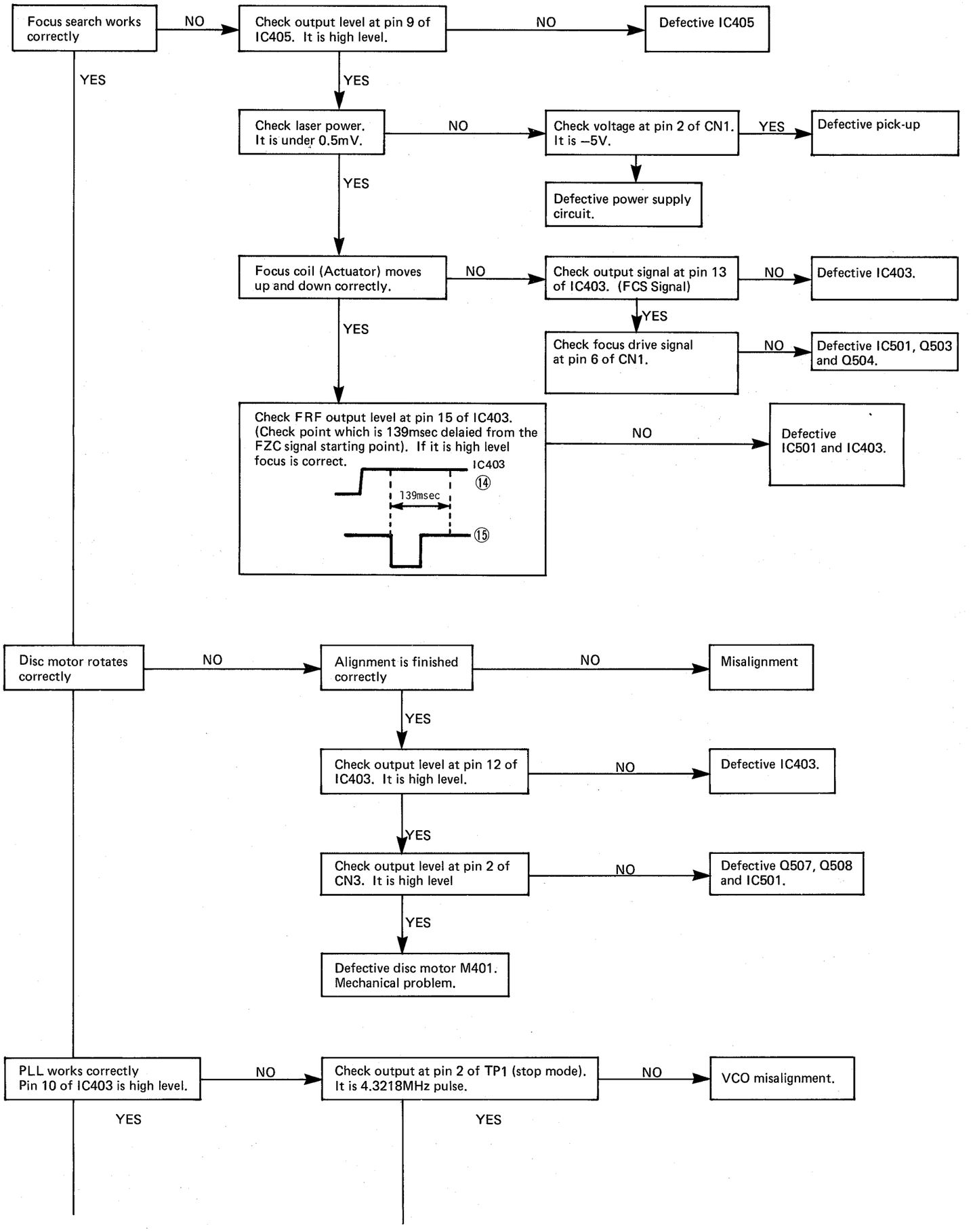
TRACKING OFFSET ADJUSTMENT

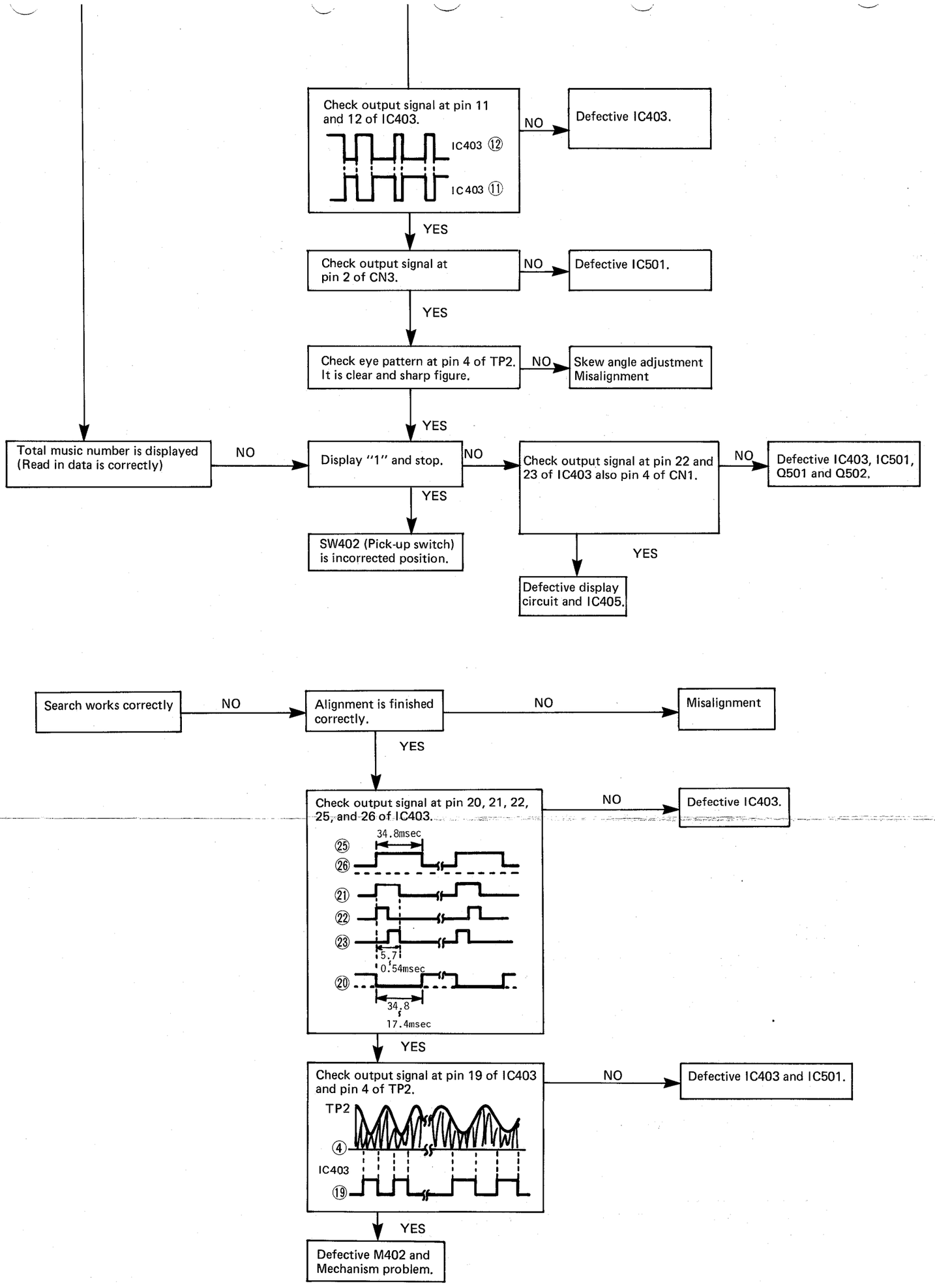


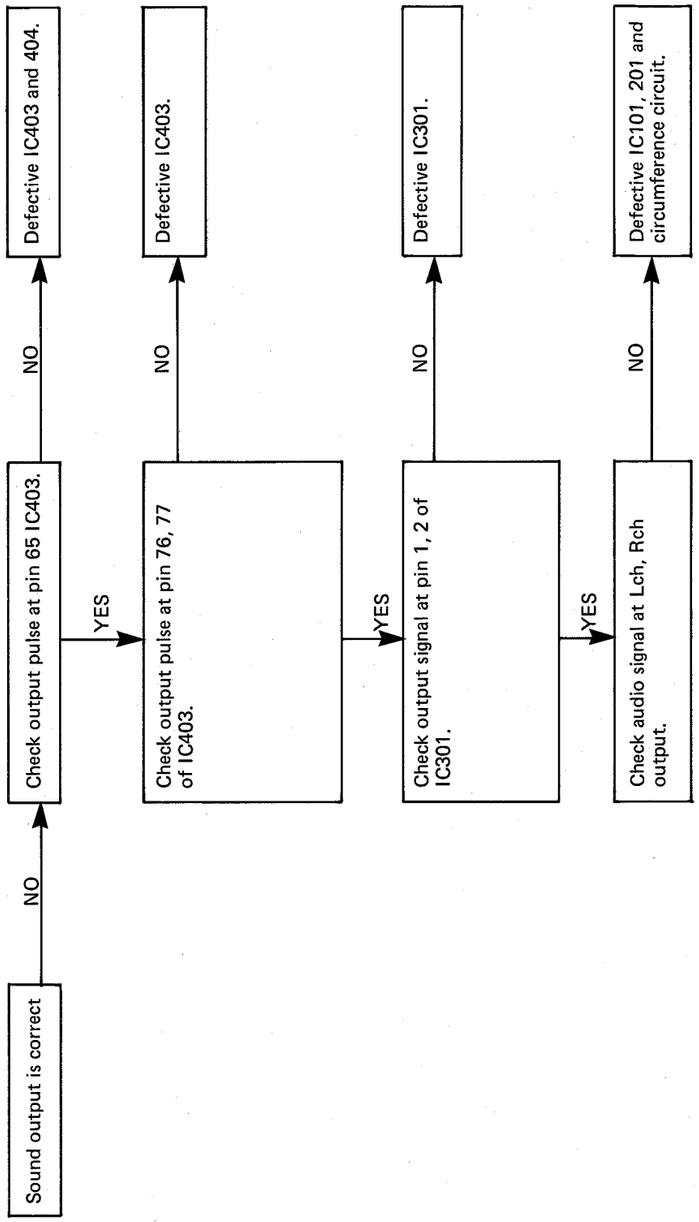
TROUBLESHOOTING GUIDE



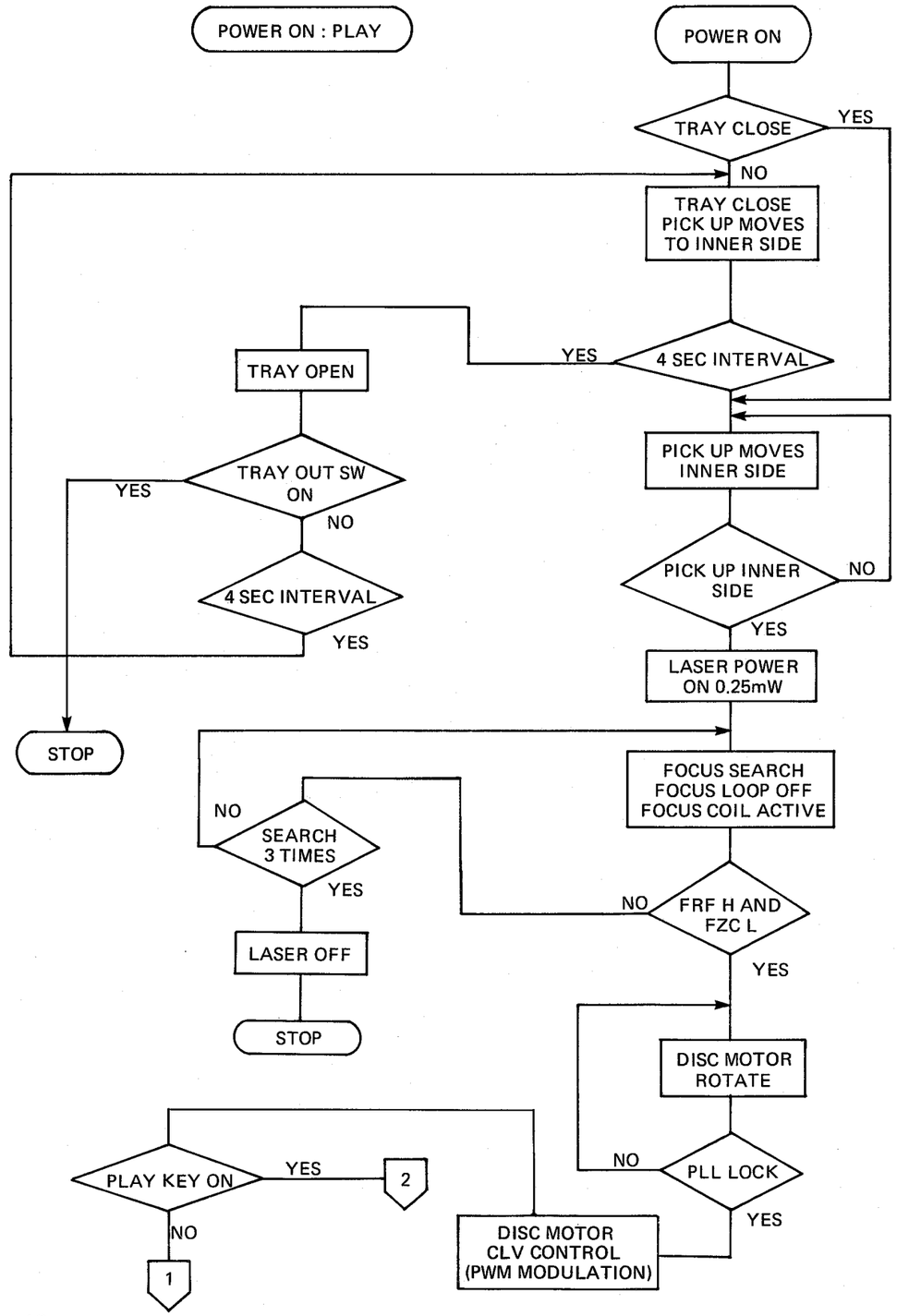


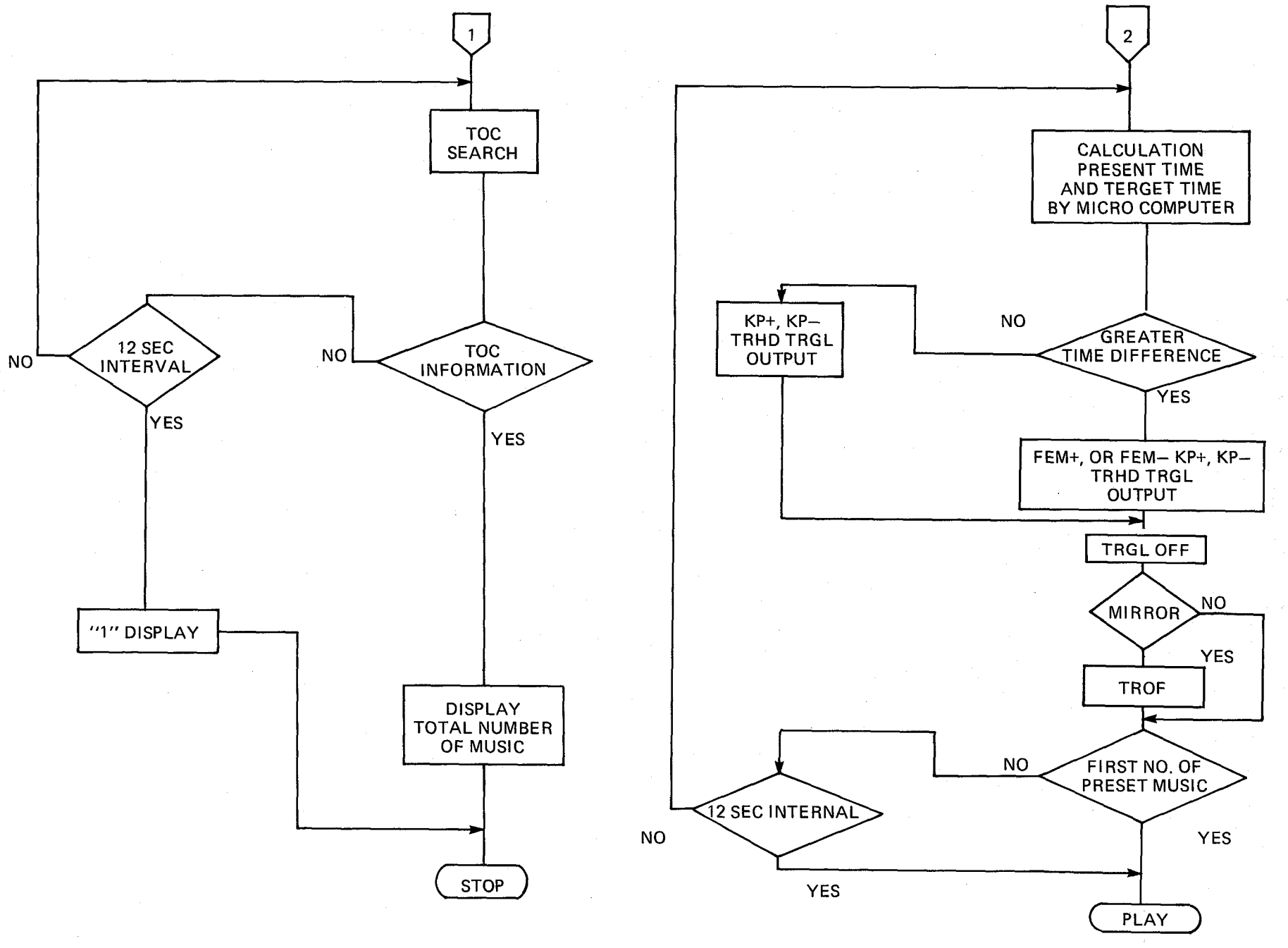

Focus search works correctly
NO
Check output level at pin 9 of IC405. It is high level.
NO
Defective IC405
YES
YES
Check laser power. It is under 0.5mV.
NO
Check voltage at pin 2 of CN1. It is –5V.
YES
Defective pick-up
Defective power supply circuit.
YES
Focus coil (Actuator) moves up and down correctly.
NO
Check output signal at pin 13 of IC403. (FCS Signal)
NO
Defective IC403.
YES
YES
Check focus drive signal at pin 6 of CN1.
NO
Defective IC501, Q503 and Q504.
Check FRF output level at pin 15 of IC403. (Check point which is 139msec delaied from the FZC signal starting point). If it is high level focus is correct.
IC403
⑭
139msec
⑮
NO
Defective IC501 and IC403.
Disc motor rotates correctly
NO
Alignment is finished correctly
NO
Misalignment
YES
Check output level at pin 12 of IC403. It is high level.
NO
Defective IC403.
YES
Check output level at pin 2 of CN3. It is high level
NO
Defective Q507, Q508 and IC501.
YES
Defective disc motor M401. Mechanical problem.
PLL works correctly Pin 10 of IC403 is high level.
NO
Check output at pin 2 of TP1 (stop mode). It is 4.3218MHz pulse.
NO
VCO misalignment.
YES
YES


Check output signal at pin 11 and 12 of IC403.
IC403 ⑫
IC403 ⑪
NO
Defective IC403.
YES
Check output signal at pin 2 of CN3.
NO
Defective IC501.
YES
Check eye pattern at pin 4 of TP2. It is clear and sharp figure.
NO
Skew angle adjustment Misalignment
YES
Total music number is displayed (Read in data is correctly)
NO
Display "1" and stop.
NO
Check output signal at pin 22 and 23 of IC403 also pin 4 of CN1.
NO
Defective IC403, IC501, Q501 and Q502.
YES
SW402 (Pick-up switch) is incorrected position.
YES
Defective display circuit and IC405.
Search works correctly
NO
Alignment is finished correctly.
NO
Misalignment
YES
Check output signal at pin 20, 21, 22, 25, and 26 of IC403.
NO
Defective IC403.
34.8msec
⑮
⑯
⑪
⑫
⑬
5.7
0.54msec
⑩
34.8
17.4msec
YES
Check output signal at pin 19 of IC403 and pin 4 of TP2.
NO
Defective IC403 and IC501.
TP2
④
IC403
⑲
YES
Defective M402 and Mechanism problem.



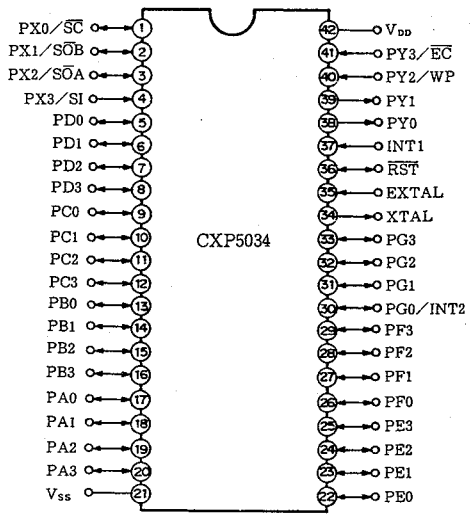
ACTION FLOW CHART




1
TOC SEARCH
12 SEC INTERVAL
NO
YES
TOC INFORMATION
NO
YES
"1" DISPLAY
DISPLAY TOTAL NUMBER OF MUSIC
STOP
2
CALCULATION PRESENT TIME AND TERGET TIME BY MICRO COMPUTER
KP+, KP– TRHD TRGL OUTPUT
NO
GREATER TIME DIFFERENCE
YES
FEM+, OR FEM– KP+, KP– TRHD TRGL OUTPUT
TRGL OFF
MIRROR
NO
YES
TROF
NO
FIRST NO. OF PRESET MUSIC
12 SEC INTERNAL
NO
YES
YES
PLAY

TERMINAL DESCRIPTION

PIN NAME	PIN NO. NEW CXP5034	I/O	Functions
PXO/SC PE2	1	OUT	Clock pulse output pin for YM3805 data
PX1/SOB (SO)	2	OUT	Output pin for instructions to YM3805
PX2/SOA	3	–	Reserved
PX3/SI (S1)	4	IN	Accepts responses in reply to instructions upon completing execution of instruction from YM3805
PD0 ~ PD3 (PG0 ~ PG3)	5 ~ 8	IN	Input of operation keys
PC0	9	IN	Determines the pick-up is located at the innermost position of the compact disc
PC1	10	IN	Detects the disc tray is closed
PC2	11	IN	Detects the disc tray is open
PC3	12	IN	YM3805 data WQ signal input
PB0 (PFO)	13	OUT	YM3805 R/W control signal output
PB1 (PF1)	14	OUT	Turns the laser diode on and off
PB2 (PF2)	15	OUT	Closes the disc tray
PB3 (PF3)	16	OUT	Open the disc tray

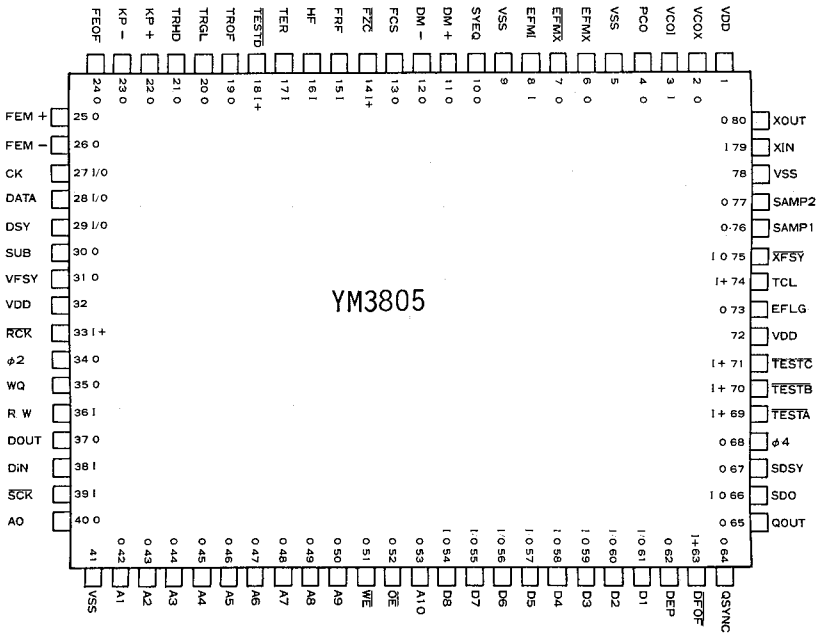


PIN NAME	PIN NO. NEW CXP5034	I/O	Functions
PA0 ~ PA2 (PD0 ~ PD2)	17 ~ 19	OUT	Output pins for display 7-segment LEDs (D702 to D704)
PA3 (PD3)	20	OUT	Output pins for turning on operation key indicators (D705 to D709)
Vss	21	–	Ground
PE0 ~ PE3 PF0 ~ PF2 (PA0 ~ PA3) (PB0 ~ PB2)	22 ~ 28	OUT	Output pins for displaying 7-segment LEDs (D701 to D704)
PF3 (PB3)	29	–	Reserved
PG0 ~ PG2 (PD0 ~ PD2)	30 ~ 32	OUT	Output pins for operation key digit signals
PG3 (PH1)	33	OUT	Output pin for displaying 7-segment LED (D701)
XTAL	34	–	Reserved
EXTAL	35	IN	Clock input pin (4.3218MHz)
RST (RESET)	36	IN	Reset input pin; initialized when power is turned on
INT1	37	IN	Power input pin
PY0	38	IN	Reserved
PY1	39	OUT	Output pin for digital muting
PY2/WP	40	IN	Power input pin
PY3/EC	41	IN	Power input pin
VDO	42	–	Power input pin

DESCRIPTION OF PIN FUNCTIONS (Assignment)

YM3805

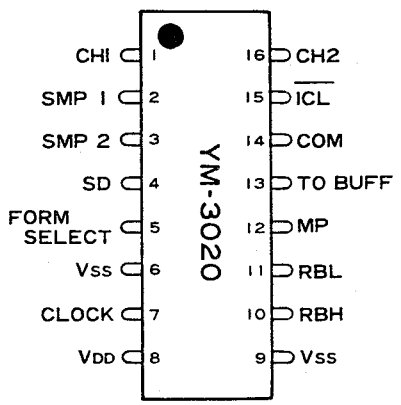
Pin No.	Designation	Function
1.	79 x IN and 80 x OUT	Clock Oscillator
2.	8 EFMI, 7 $\overline{\text{EFMX}}$, and 6 EFMX	EFM External Circuit
3.	4 PCO, 3 VCO1, and 2 VCOX	Clock Regeneration Circuit
4.	10 SYEQ	SYNC Match Signal
5.	27 CK, 28 DATA, and 29 DSY	EFM Demondulation Signal Check Output
6.	30 SUB, 31 VFSY, and 33 $\overline{\text{RCK}}$	Sub-code Output
7.	35 WQ, 36 R/$\overline{\text{W}}$, 37 DOUT, and 39 $\overline{\text{SCK}}$	Q-code Output related Pins
8.	36 R/$\overline{\text{W}}$, 38 DIN, and 39 $\overline{\text{SCK}}$	μ COM Command related Pins
9.	Input 14 $\overline{\text{FZC}}$ - FRF, and Output FCS	Focus Servo-mechanism related Pins
10.	11 DM+, and 12 DM–	Disc Servo-mechanism related Pins
11.	Input 16 HF, and 17 TER Output 19 TROF, 20 TRGL, 21 TRHD, 22 KP+, and 23 KP–	Tracking Servo-mechanism related Pins
12.	24 FEOF, 25 FEM+, and 26 FEM–	Feed Servo-mechanism related Pins
13.	40AO ~ 53A10, 51 $\overline{\text{WE}}$, 52 $\overline{\text{OE}}$, and 54D8 ~ 61D1	RAM Connection
14.	75 $\overline{\text{XFSY}}$	Crystal Clock SYNC Signal
15.	73 EFLG	C1 and C2 Error Correction Check Signal
16.	34 ϕ2, 66 SDO, 67 SDSY, 69 $\overline{\text{TESTA}}$, and 71 $\overline{\text{TESTC}}$	DATA Control Circuit - Serial Signal Output
17.	65 Q OUT, 64 Q SYNC, 76 SAMP1, 77 SAMP 2, 68 ϕ4, and 63 $\overline{\text{DFOF}}$	DAC Interface
18.	62 DEP	De-emphasis Signal
19.	69 $\overline{\text{TEST}}$, 70 $\overline{\text{TEST}}$, 71 $\overline{\text{TEST}}$, 18 $\overline{\text{TEST}}$ D, and 8 $\overline{\text{TCL}}$	Test Pins


YM3805
FEOF KP– KP+ TRHD TRGL TROF TESTD TER HF FRF FZC FCS DM– DM+ SYEQ VSS EFMI EFMX EFMX VSS PCO VCOI VCOX VDD
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
FEM+ FEM– CK DATA DSY SUB VFSY VDD RCK φ2 WQ R/W DOUT DIN SCR AO
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65
XOUT XIN VSS SAMP2 SAMP1 XFSY TCL EFLG VDD TESTC TESTB TESTA φ4 SDSY SDO QOUT
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
VSS A1 A2 A3 A4 A5 A6 A7 A8 A9 WE OE A10 D8 D7 D6 D5 D4 D3 D2 D1 DEP DFOF QSYNC

DESCRIPTION OF PIN FUNCTIONS (Assignment)

YM3020

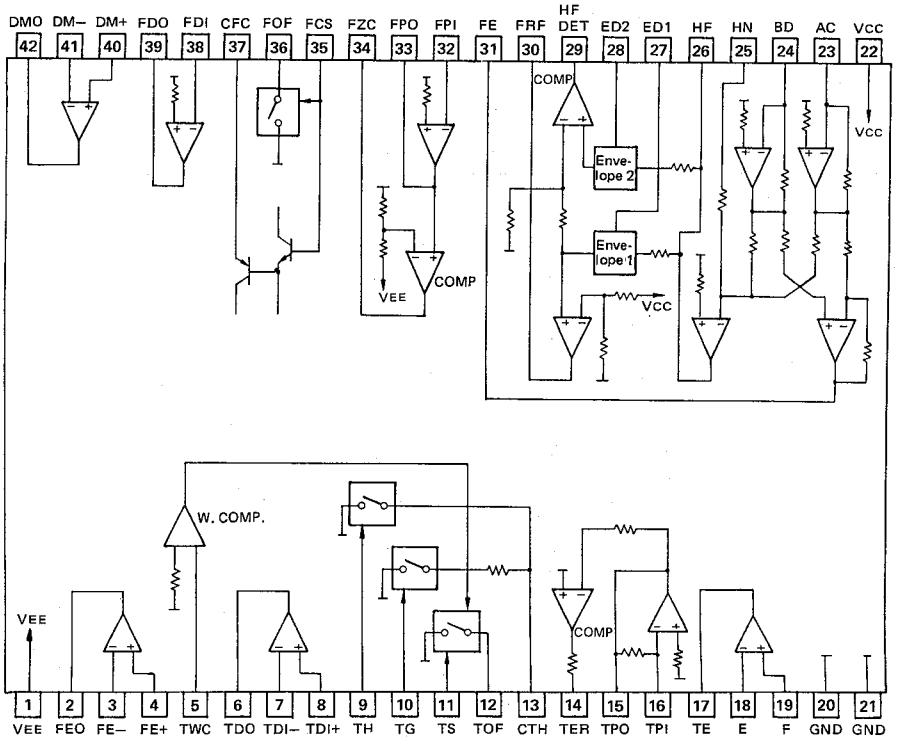
Pin No.	Designation	Function (Assignment)
1.	V OUT CH1	Sample-hold analog switch output for Channel 1.
2.	SMP 1	Interval of signal at state "1" will be the sampling time of CH1.
3.	SMP 2	Interval of signal at state "1" will be the sampling time of CH2. The rising edge of SMP 1 and SMP 2 is used to generate the internal signal to latch the serial data. The level frequency characteristics will be improved as the signal time of SMP 1 and SMP 2 becomes longer.
4.	SD	Serial input of converted digital signal.
5.	FORM SELECT	Corresponds to binary input at state "1", and corresponds to 2's complement input at state "0".
6.	V_{SS}	Low-potential side power (GND).
7.	CLOCK	Clock to drive shift-resistor and time-generator ($\phi 4$).
8.	V_{DD}	High-potential side reference power.
9.	V_{SS}	Low-potential side reference power (GND).
10.	RBH	Since the same resistance is inserted between the RBH pin and the internal V_{DD} power supply and between the RBL pin and the internal V_{SS} (GND) power supply, a high precision voltage of 1/2 V_{DD} can be obtained when both pins are connected. This voltage is applied on the MP pin through the buffer operational amplifier.
11.	RBL	As in the case of the basic circuit, the drift from 1/2 V_{DD} can be corrected by providing an appropriate external resistance on either one of the two pins.
12.	MP	An exponential analog shift is executed with the potential applied on MP as the reference. Normally, bias is applied for 1/2 V_{DD}.
13.	TO BUFF	Analog output of DAC is input to buffer operational amplifier.
14.	COM	Common input of analog switch for CH1 and CH2.
15.	ICL	"1" : Normal operation. "0" : Will become no-signal output regardless of D signal.
16.	V_{OUT} CH2	Sample-hold analog switch output for CH2.



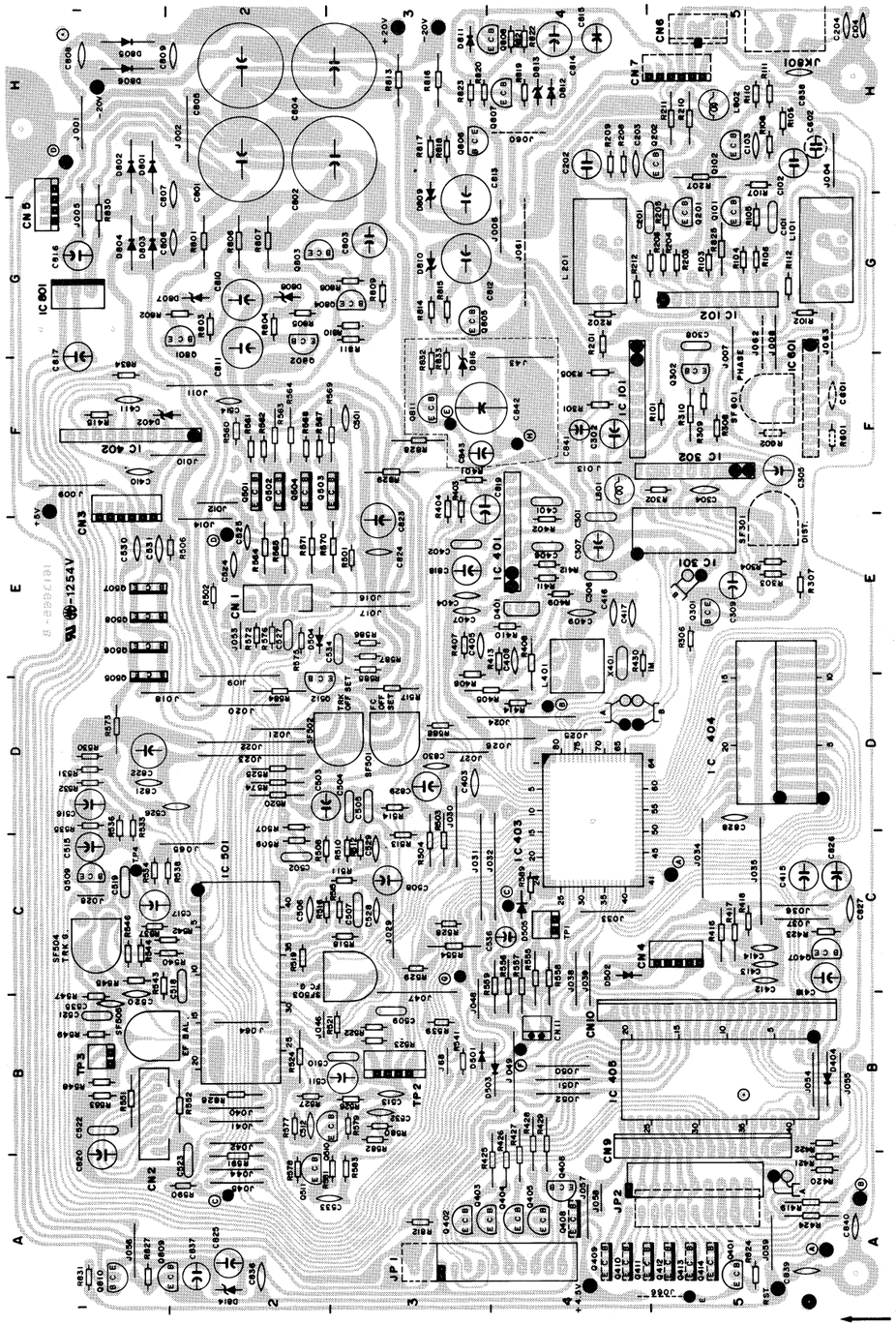
DESCRIPTION OF PIN FUNCTIONS

IG15630

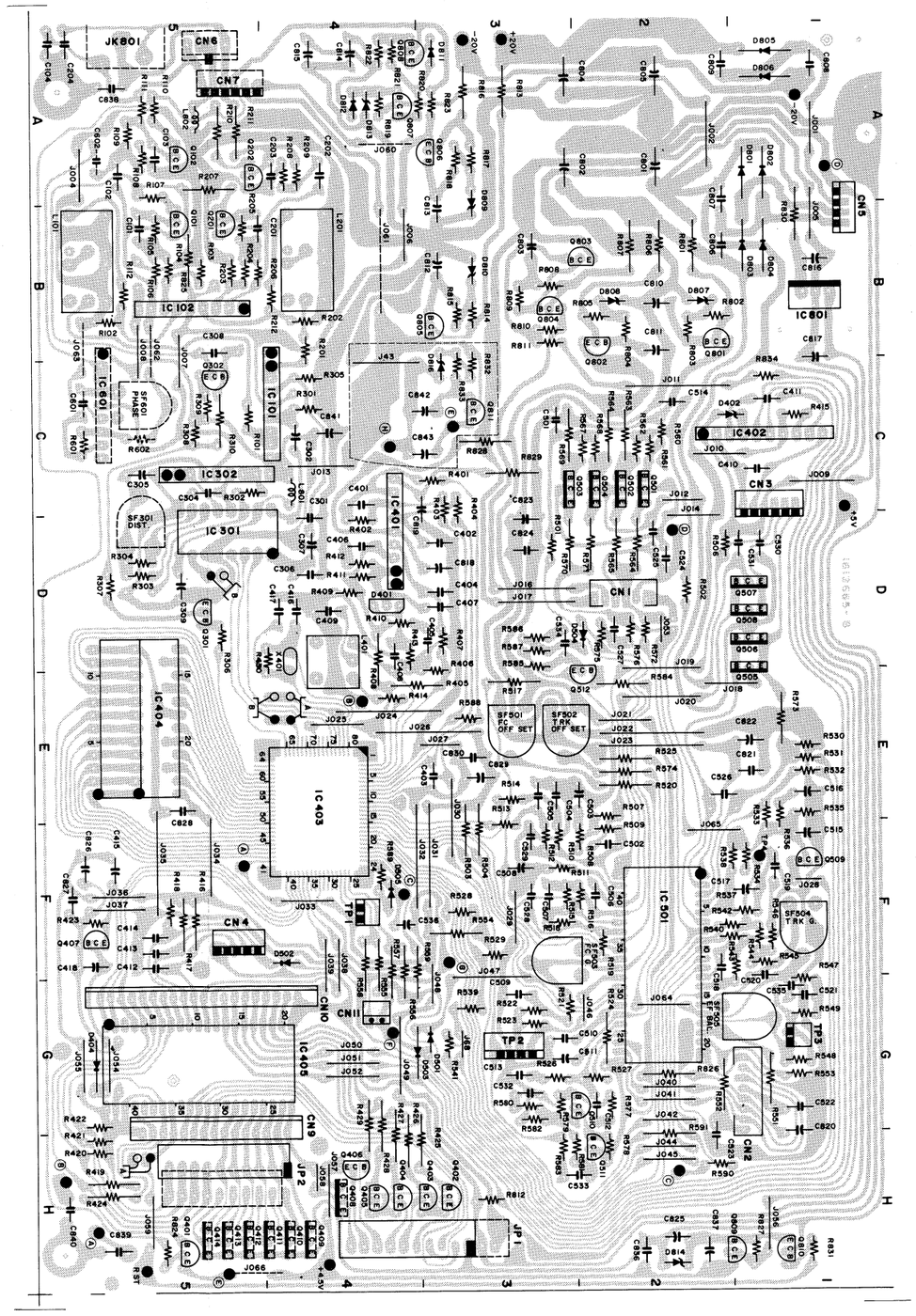
Symbol	Item
ICC	Circuit current.
I_{EE}	Circuit current.
V_{HF}	HF amplifier output voltage.
V_{FFO}	FOCUS offset voltage.
V_{TEO}	TRACKING offset voltage.
VthF	Threshold voltage of FRF comparator.
ThD	Threshold level of HFD comparator.
VthC	Threshold voltage of FZC comparator.
VthR	Threshold voltage of TER comparator.
ATT_{FOF}	Attenuation factor of FOCUS OFF SW.
ATT_{TOF1}	TRACKING SW. attenuation factor 1.
ATT_{TOF2}	TRACKING SW. attenuation factor 2.
ATT_{TOF3}	TRACKING SW. attenuation factor 3.
ATT_{TOF4}	TRACKING SW. attenuation factor 4.
VDM	DM amplifier output voltage.
V_{FEM}	FEM amplifier output voltage.
V_{FS}	FOCUS search voltage.
V_{FDO}	FOCUS output voltage.
V_{TDO}	TRACKING output votlage.


DMO DM− DM+ FDO FDI CFC FOF FCS FZC FPO FPI FE FRF HF DET ED2 ED1 HF HN BD AC Vcc
42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22
COMP
Enve-lope 2
Enve-lope 1
VCC
VEE
COMP
W. COMP.
VEE
COMP
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
VEE FEO FE− FE+ TWC TDO TDI− TDI+ TH TG TS TOF CTH TER TPO TPI TE E F GND GND

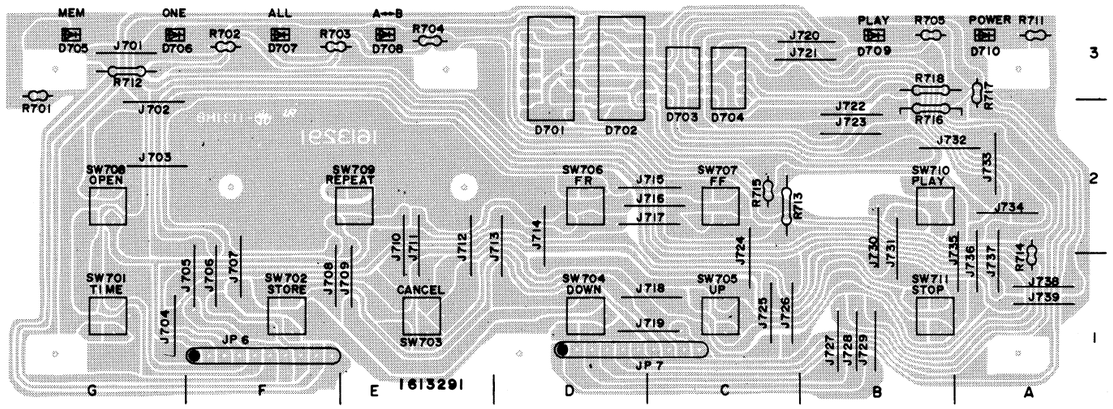
MAIN PCB TOP VIEW



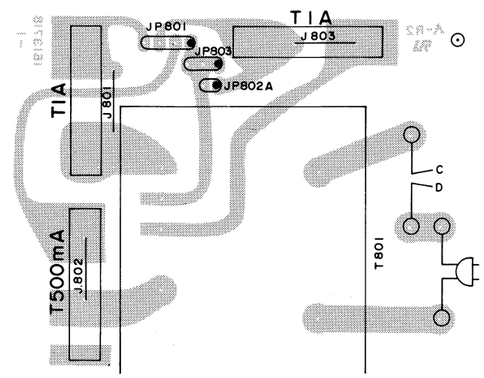
MAIN PCB (BOTTOM VIEW)



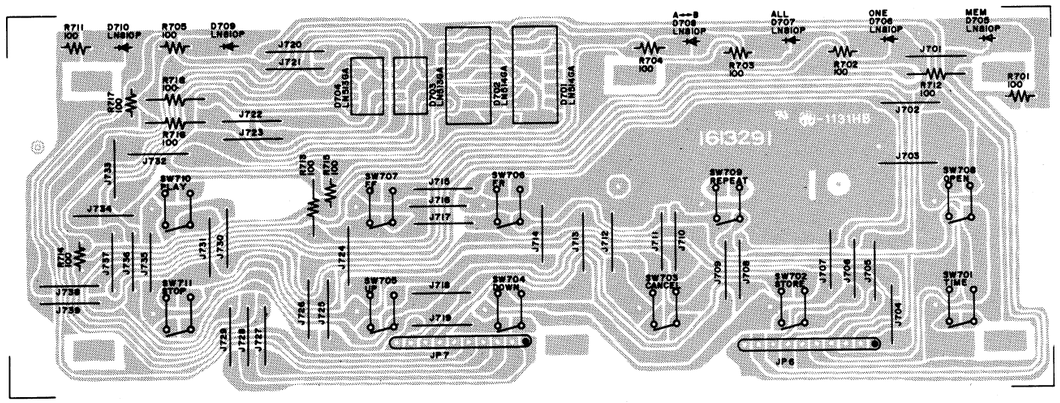
CONTROL PCB TOP VIEW



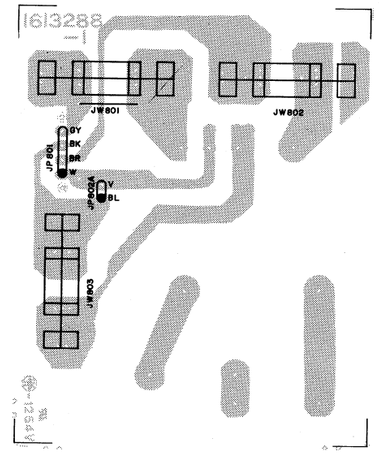
TRANSFORMER PCB TOP VIEW



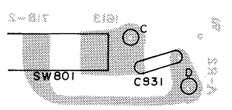
CONTROL PCB BOTTOM VIEW



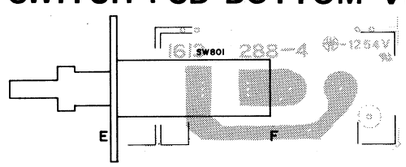
TRANSFORMER PCB BOTTOM VIEW



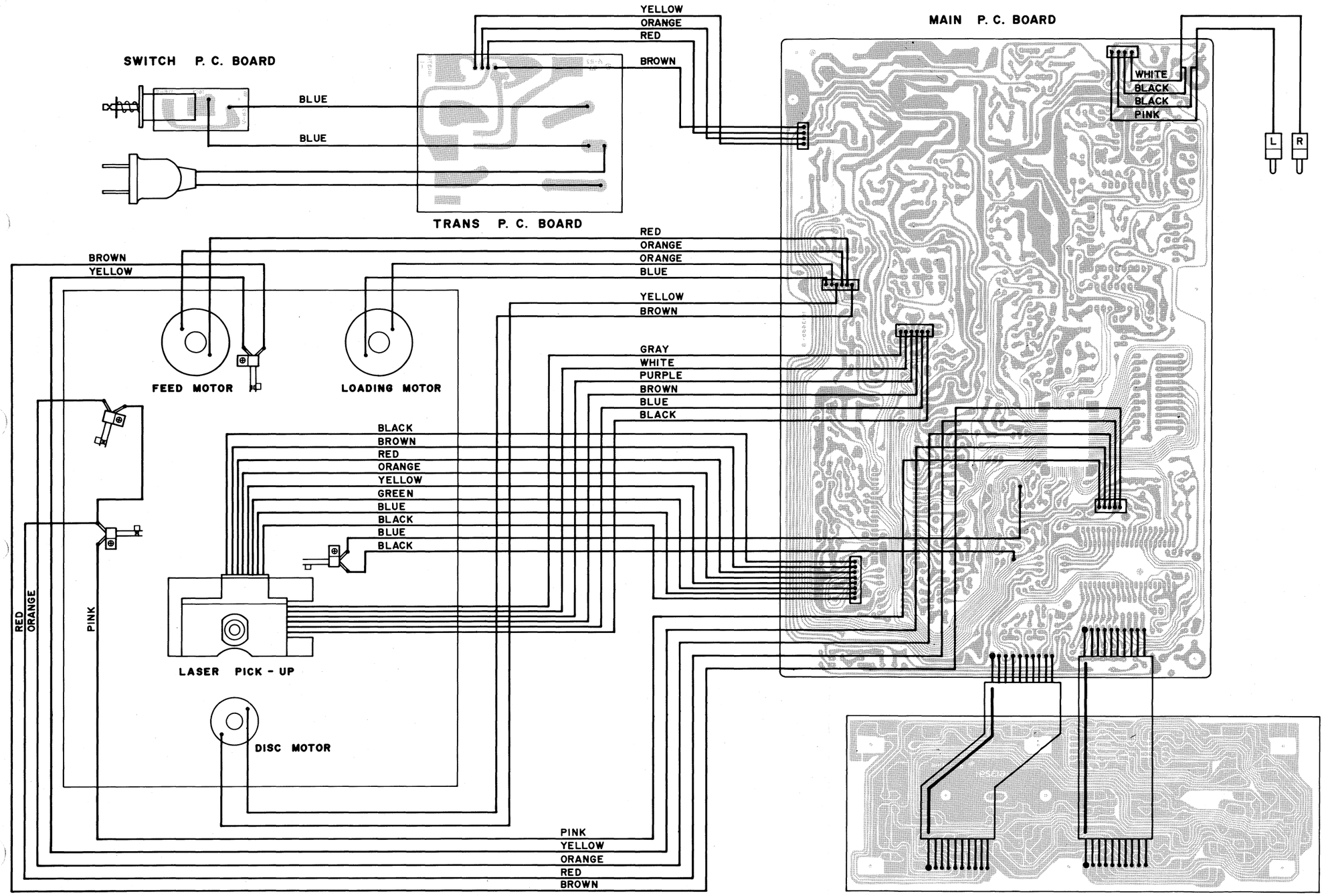
SWITCH PCB TOP VIEW



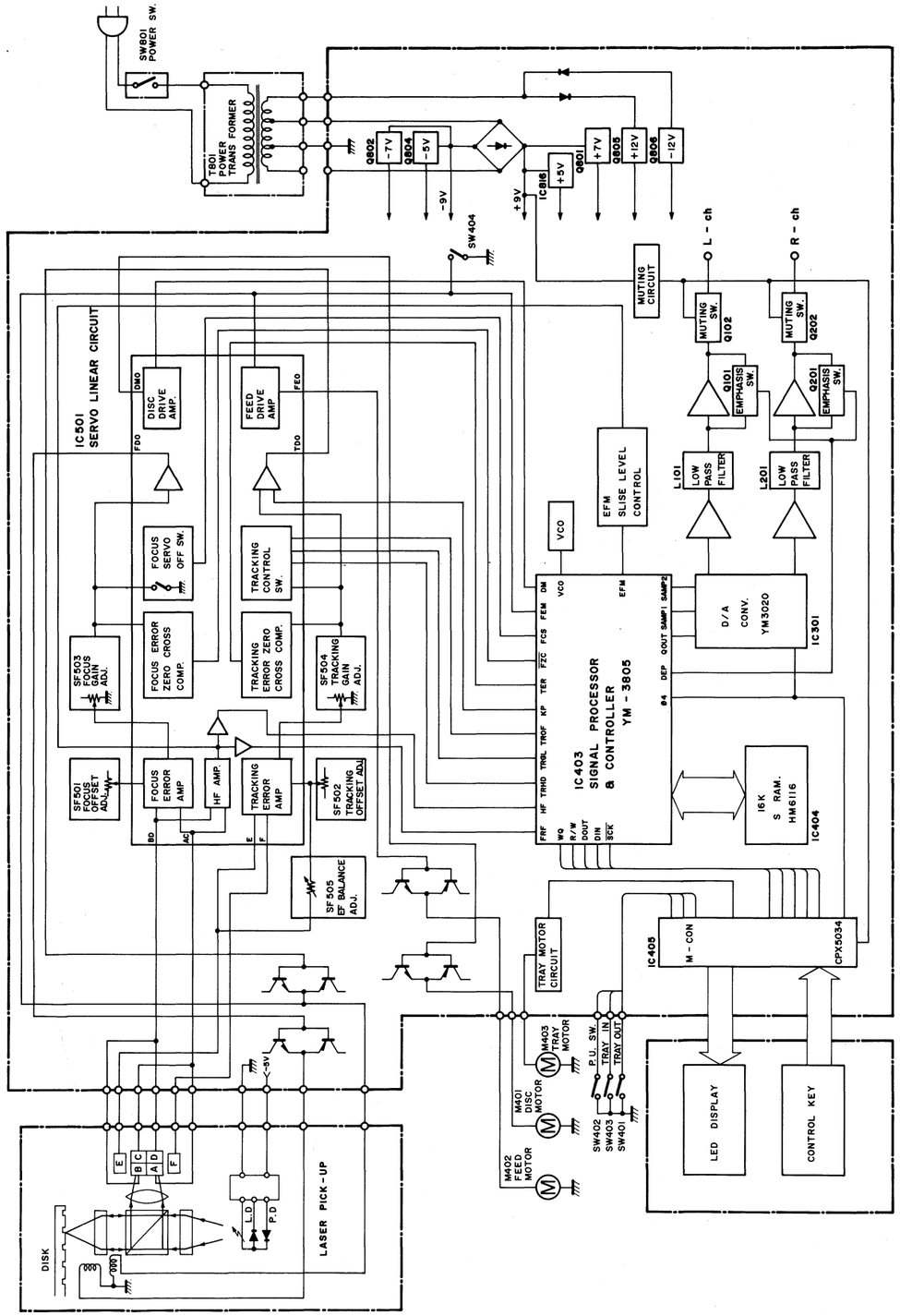
SWITCH PCB BOTTOM VIEW



WIRING DIAGRAM

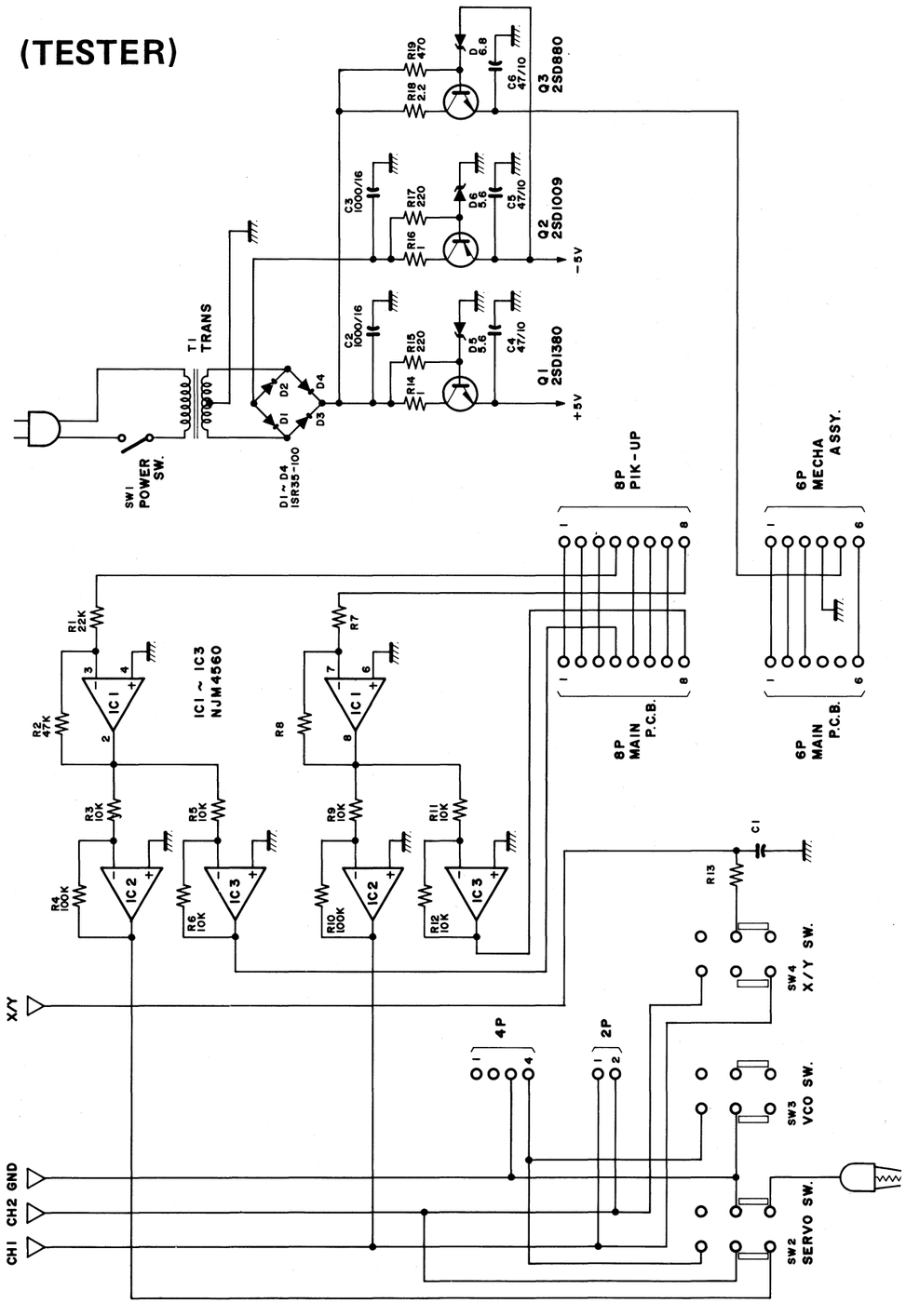


BLOCK DIAGRAM

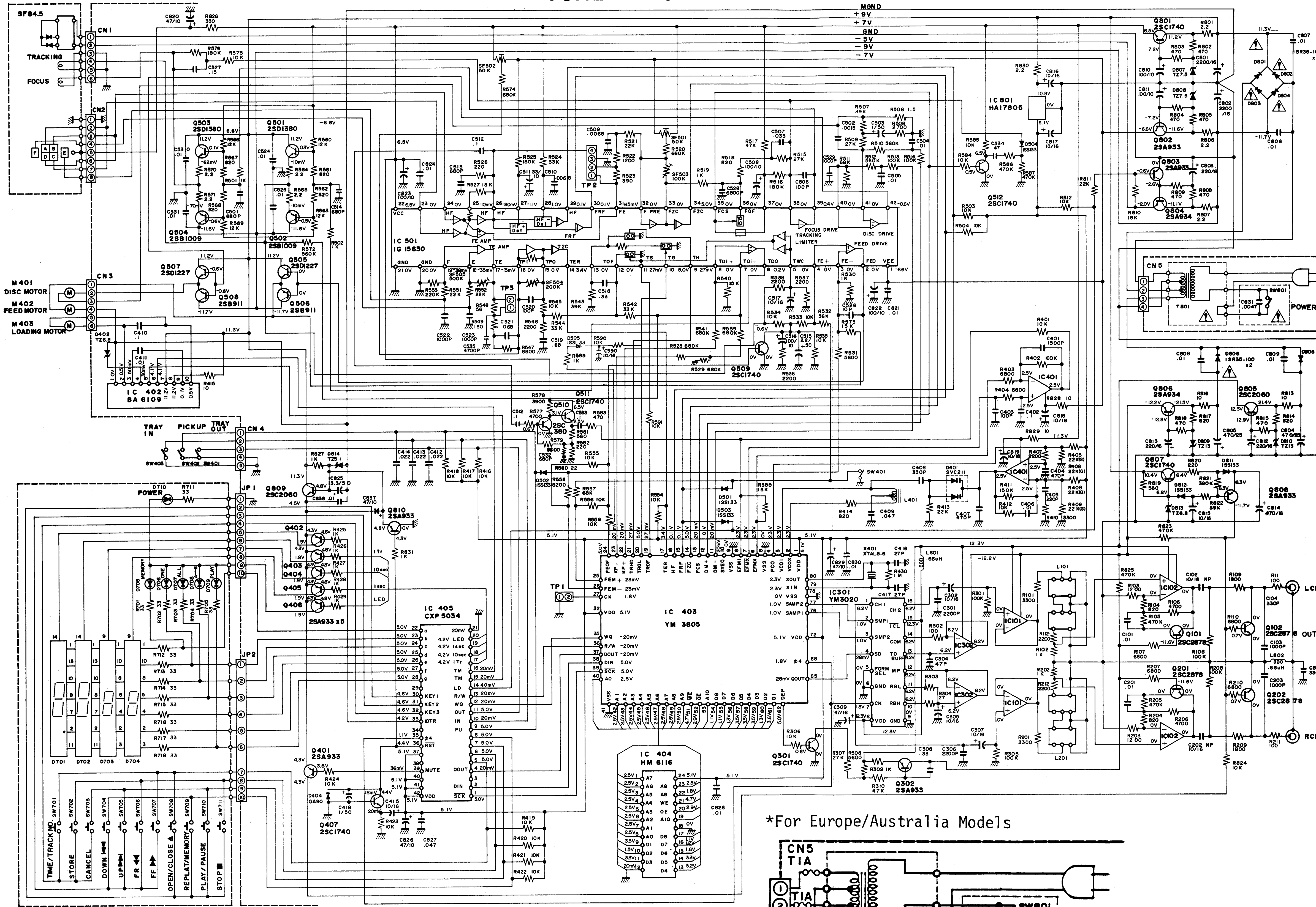


SCHEMATIC DIAGRAM

(TESTER)



SCHEMATIC DIAGRAM

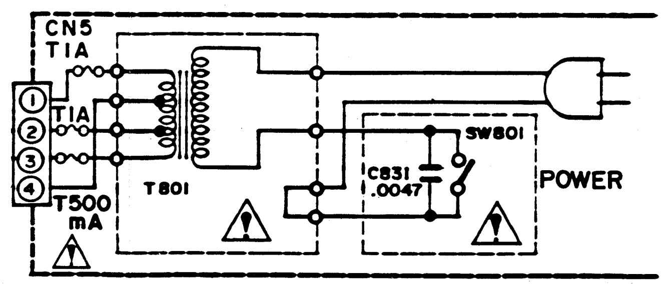


SF84.5
TRACKING
FOCUS
CN1
CN2
CN3
CN 4
CN5
JP1
JP2
MGND
+9V
+7V
GND
-5V
-9V
-7V
M401 DISC MOTOR
M402 FEED MOTOR
M403 LOADING MOTOR
IC 402 BA 6109
IC 501 IG 15630
IC 801 HA17805
IC 405 CXP 5034
IC 403 YM 3805
IC 404 HM 6116
IC301 YM3020
IC401
IC101
IC102
IC302
TP1
TP2
TP3
FE AMP
TE AMP
FOCUS DRIVE
TRACKING LIMITER
DISC DRIVE
FEED DRIVE
Q503 2SD1380
Q501 2SD1380
Q504 2SB1009
Q502 2SB1009
Q507 2SD1227
Q508 2SB911
Q505 2SD1227
Q506 2SB911
Q509 2SC1740
Q510 2SC380
Q511 2SC1740
Q512 2SC1740
Q801 2SC1740
Q802 2SA933
Q803 2SA933
Q804 2SA934
Q805 2SC2060
Q806 2SA934
Q807 2SC1740
Q808 2SA933
Q809 2SC2060
Q810 2SA933
Q401 2SA933
Q407 2SC1740
2SA933 x5
Q301 2SC1740
Q302 2SA933
Q101 2SC2878
Q102 2SC2878
Q201 2SC2878
Q202 2SC2878
T801
POWER
SW801
TRAY IN
PICKUP
TRAY OUT
SW403
SW402
SW401
D710 POWER
MEMORY
ONE
ALL
A↔B
PLAY
D701
D702
D703
D704
TIME/TRACK NO.
STORE
CANCEL
DOWN
UP
FR
FF
OPEN/CLOSE
REPLAT/MEMORY
PLAY/PAUSE
STOP
LCH
RCH
OUTPUT
L101
L201
L401
L801
X401 XTAL8.6

WARNING:

Replacement parts which special safety characteristics are identified by showing on this schematic diagram. Replace these critical components with recommended replacement parts. Don't degrade the safety of this set through inproper servicing. Service personnel to make leakage-current or risistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

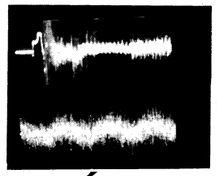
*For Europe/Australia Models



WAVE FORM INFORMATIONS

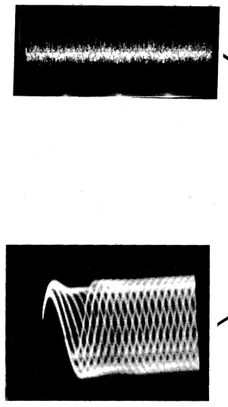
50mS/div.
0.5V/div.
PLAY

500mS/div.
1V/div.
FOCUS SEARCH

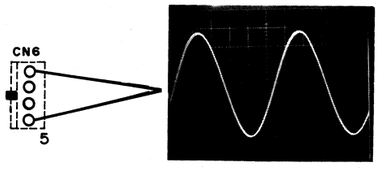


50mS/div.
0.5V/div.
PLAY

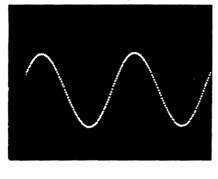
500mS/div.
1V/div.
FOCUS SEARCH



3VP-P

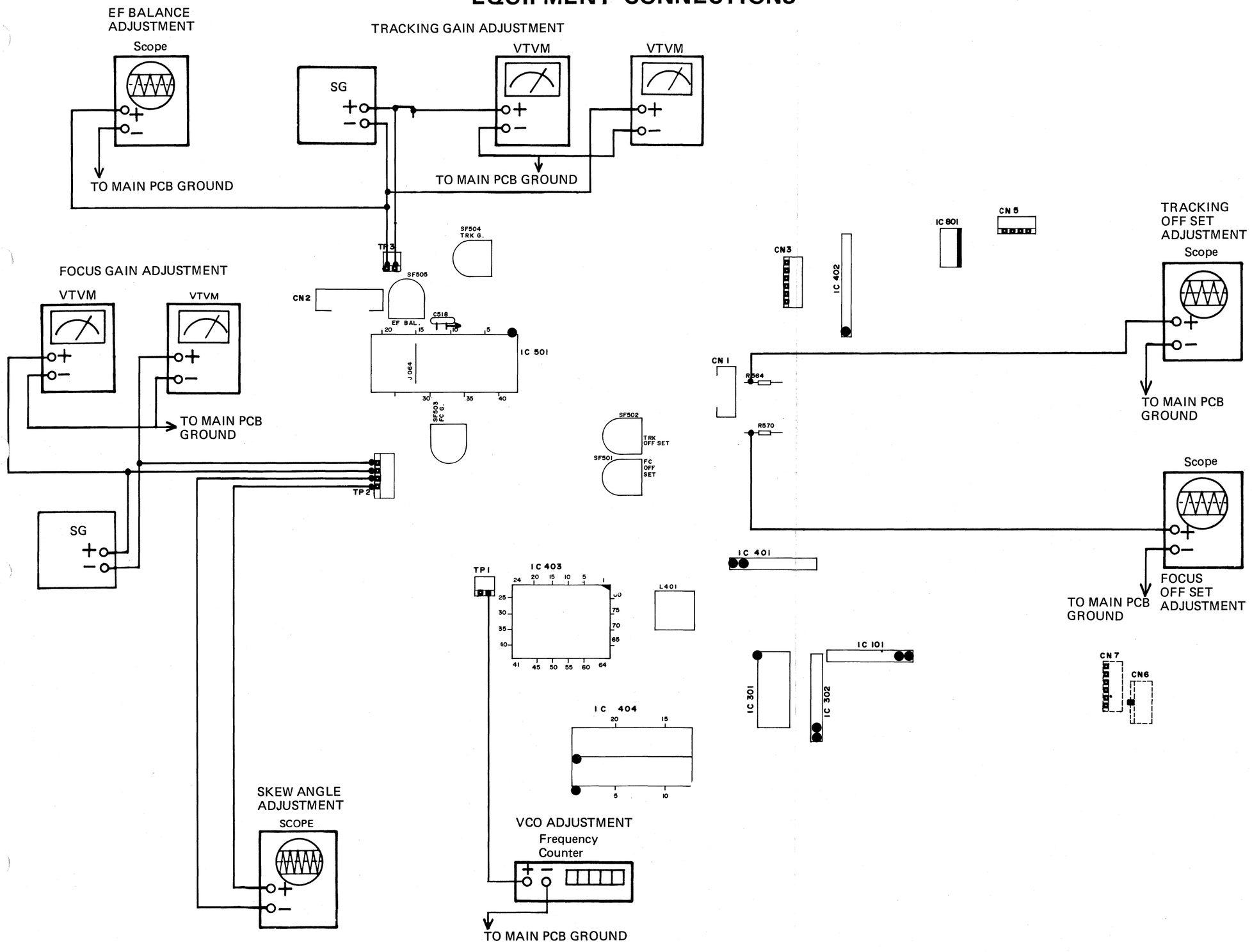


5.2VP-P
SONY YEDS-18
TRACK 2
PLAY



6.2VP-P
SONY YEDS-18 TRACK 2
PLAY

EQUIPMENT CONNECTIONS



REPLACEMENT PARTS LIST

ELECTRICAL PARTS

Ref. No.	Mfr. Part No.	Description
	1613665X	**Main PCB Ass'y**
	CAPACITORS	
C101	125U103	Cap. Thin film 0.01mfd
C102	126U106	Cap. Electrolytic 10mfd/16V
C103	12X2102	Cap. Ceramic 1000pF
C104	1270331	Cap. Ceramic 330pF
C201	125U103	Cap. Thin film 0.01mfd
C202	126U106	Cap. Electrolytic 10mfd/16V
C203	12X2102	Cap. Ceramic 1000pF
C204	1270331	Cap. Ceramic 330pF
C301	125U222	Cap. Thin film 0.0022mfd
C302	126C106	Cap. Electrolytic 10mfd/16V
C304	1270470	Cap. Ceramic 47pF
C305	126C106	Cap. Electrolytic 10mfd/16V
C306	125U222	Cap. Thin film 0.0022mfd
C307	126C106	Cap. Electrolytic 10mfd/16V
C308	125U334	Cap. Thin film 0.33mfd
C309	126C476	Cap. Electrolytic 47mfd/16V
C401	125U152	Cap. Thin film 0.0015mfd
C402	125U104	Cap. Thin film 0.1mfd
C403	1270101	Cap. Ceramic 100pF
C404	1270471	Cap. Ceramic 470pF
C405	1270221	Cap. Ceramic 220pF
C406	125U103	Cap. Thin film 0.01mfd
C407	1270471	Cap. Ceramic 470pF
C408	1270331	Cap. Ceramic 330pF
C409	12F3473	Cap. Ceramic 0.047mfd
C410	12X6104	Cap. Ceramic 0.1mfd
C411	12F3103	Cap. Ceramic 0.01mfd
C412	12F3223	Cap. Ceramic 0.022mfd
C413	12F3223	Cap. Ceramic 0.022mfd
C414	12F3223	Cap. Ceramic 0.022mfd
C415	126C106	Cap. Electrolytic 10mfd/16V
C416	1270270	Cap. Ceramic 27pF
C417	1270270	Cap. Ceramic 27pF
C418	126F105	Cap. Electrolytic 1mfd/50V
C501	1270681	Cap. Ceramic 680pF
C502	125U152	Cap. Thin film 0.0015mfd
C503	126F105	Cap. Electrolytic 1mfd/50V
C504	12F3103	Cap. Ceramic 0.01mfd
C505	12F3103	Cap. Ceramic 0.01mfd
C506	1270101	Cap. Ceramic 100pF
C507	125U333	Cap. Thin film 0.033mfd
C508	126B107	Cap. Electrolytic 100mfd/10V
C509	125U682	Cap. Thin film 0.0068mfd
C510	125U682	Cap. Thin film 0.0068mfd
C511	126B336	Cap. Electrolytic 33mfd/10V
C512	12X6104	Cap. Ceramic 0.1mfd
C513	1270681	Cap. Ceramic 680pF
C514	1270681	Cap. Ceramic 680pF
C515	126F225	Cap. Electrolytic 2.2mfd/50V
C516	126B107	Cap. Electrolytic 100mfd/10V

Ref. No.	Mfr. Part No.	Description
C517	126C106	Cap. Electrolytic 10mfd/16V
C518	125U334	Cap. Thin film 0.33mfd
C519	125U684	Cap. Thin film 0.68mfd
C520	1270101	Cap. Ceramic 100pF
C521	125U683	Cap. Thin film 0.068mfd
C522	125U102	Cap. Thin film 0.001mfd
C523	125U102	Cap. Thin film 0.001mfd
C524	12F3103	Cap. Ceramic 0.01mfd
C525	12F3103	Cap. Ceramic 0.01mfd
C526	1270100	Cap. Ceramic 10pF
C527	125U154	Cap. Thin film 0.15mfd
C528	12F3682	Cap. Ceramic 6800pF
C529	12X2102	Cap. Ceramic 1000pF
C530	12F3103	Cap. Ceramic 0.01mfd
C531	12F3103	Cap. Ceramic 0.01mfd
C532	1270681	Cap. Ceramic 680pF
C533	12X6104	Cap. Ceramic 0.1mfd
C534	125U474	Cap. Thin film 0.47mfd
C535	12F3472	Cap. Ceramic 0.0047mfd
C536	126C106	Cap. Electrolytic 10mfd/16V
C801	126C228	Cap. Electrolytic 2200mfd/16V
C802	126C228	Cap. Electrolytic 2200mfd/16V
C803	126C227	Cap. Electrolytic 220mfd/16V
C804	126D477	Cap. Electrolytic 470mfd/25V
C805	126D477	Cap. Electrolytic 470mfd/25V
C806	12F3103	Cap. Ceramic 0.01mfd
C807	12F3103	Cap. Ceramic 0.01mfd
C808	12F3103	Cap. Ceramic 0.01mfd
C809	12F3103	Cap. Ceramic 0.01mfd
C810	126B107	Cap. Electrolytic 100mfd/10V
C811	126B107	Cap. Electrolytic 100mfd/10V
C812	126C227	Cap. Electrolytic 220mfd/16V
C813	126C227	Cap. Electrolytic 220mfd/16V
C814	126C477	Cap. Electrolytic 470mfd/16V
C815	126C106	Cap. Electrolytic 10mfd/16V
C816	126C106	Cap. Electrolytic 10mfd/16V
C817	126C106	Cap. Electrolytic 10mfd/16V
C818	126C106	Cap. Electrolytic 10mfd/16V
C819	126C106	Cap. Electrolytic 10mfd/16V
C820	126B476	Cap. Electrolytic 47mfd/10V
C821	12F3103	Cap. Ceramic 0.01mfd
C822	126B107	Cap. Electrolytic 100mfd/10V
C823	126B107	Cap. Electrolytic 100mfd/10V
C824	12F3103	Cap. Ceramic 0.01mfd
C825	126F335	Cap. Electrolytic 3.3mfd/50V
C826	126B476	Cap. Electrolytic 47mfd/10V
C827	12F3473	Cap. Ceramic 0.047mfd
C828	12F3103	Cap. Ceramic 0.01mfd
C829	126B476	Cap. Electrolytic 47mfd/10V
C830	12F3103	Cap. Ceramic 0.01mfd
C836	12F3103	Cap. Ceramic 0.01mfd
C837	126B476	Cap. Electrolytic 47mfd/10V
C838	1270331	Cap. Ceramic 330pF

Ref. No.	Mfr. Part No.	Description
C839	12F3103	Cap. Ceramic 0.01mfd
C840	12F3103	Cap. Ceramic 0.01mfd
C841	126C106	Cap. Electrolytic 10mfd/16V
	COILS	
L101	1810963 or 1810964	Filter, Low Pass
L102	2158109	Coil, 1mH
L201	1810963 or 1810964	Filter, Low Pass
L202	2158109	Coil, 1mH
L401	117D469	Coil, VCO
L801	112D100 or 112M100	Coil, 0.48μH
L802	112D100 or 112M100	Coil, 0.48μH
	DIODES	
D401	ISV55	Diode, Vari-cap
D402	TZ-6.8CT	Diode, Zener
D404	0A90	Diode, Germanium
D501	0A90	Diode, Germanium
D502	1SS133	Diode,
D503	1SS133	Diode,
D504	1SS133	Diode,
D801	ISR35-100	Diode, Rectifier
D802	ISR35-100	Diode, Rectifier
D803	ISR35-100	Diode, Rectifier
D804	ISR35-100	Diode, Rectifier
D805	ISR35-100	Diode, Rectifier
D806	ISR35-100	Diode, Rectifier
D807	TZ-7.5B	Diode, Zener
D808	TZ-7.5B	Diode, Zener
D809	TZ-13B	Diode, Zener
D810	TZ-13B	Diode, Zener
D811	1SS133	Diode,
D812	1SS133	Diode,
D813	TZ-6.8C	Diode, Zener
D814	TZ-5.1B	Diode, Zener
	ICS	
IC101	M5238L or NJM072S	IC, Operational Amp
IC102	BA715 or NJM4558S	IC, Operational Amp
IC301	YM-3020	IC, D/A Converter
IC302	NJM4560S or M5260L or μPC4072HA	IC, Operational Amp
IC401	NJM2043S	IC, Operational Amp
IC402	BA6109	IC, Motor Turn Over
IC403	YM-3805	IC, SPC
IC404	HM6116-4 or TMM2116BP-15 or SRM2016C-20	IC, 16K RAM
IC501	IG-15630	IC, SLC

Ref. No.	Mfr. Part No.	Description
IC801	HA17805 or μPC7805H or NJM7805A	IC, Regulator 5V 1A
	POTENTIOMETERS	
SF501	138N029 or 1380572	Potentiometer, 50K ohm
SF502	138N029 or 1380572	Potentiometer, 50K ohm
SF503	138N004 or 1380573	Potentiometer, 100K ohm
SF504	138N004 or 1380573	Potentiometer, 100K ohm
SF505	138N979	Potentiometer, 470K ohm
	RESISTORS	
R101	132A332	Res. Carbon 3.3K ohm 1/6W, ±5%
R102	132A102	Res. Carbon 1K ohm 1/6W, ±5%
R103	132A122	Res. Carbon 1.2K ohm 1/6W, ±5%
R104	132A821	Res. Carbon 820 ohm 1/6W, ±5%
R105	132A474	Res. Carbon 470K ohm 1/6W, ±5%
R106	132A472	Res. Carbon 4.7K ohm 1/6W, ±5%
R107	132A682	Res. Carbon 6.8K ohm 1/6W, ±5%
R108	132A104	Res. Carbon 100K ohm 1/6W, ±5%
R109	132A182	Res. Carbon 1.8K ohm 1/6W, ±5%
R110	132A682	Res. Carbon 6.8K ohm 1/6W, ±5%
R112	132A222	Res. Carbon 2.2K ohm 1/6W, ±5%
R201	132A332	Res. Carbon 3.3K ohm 1/6W, ±5%
R202	132A102	Res. Carbon 1K ohm 1/6W, ±5%
R203	132A122	Res. Carbon 1.2K ohm 1/6W, ±5%
R204	132A821	Res. Carbon 820 ohm 1/6W, ±5%
R205	132A474	Res. Carbon 470K ohm 1/6W, ±5%
R206	132A472	Res. Carbon 4.7K ohm 1/6W, ±5%
R207	132A682	Res. Carbon 6.8K ohm 1/6W, ±5%
R208	132A104	Res. Carbon 100K ohm 1/6W, ±5%
R209	132A182	Res. Carbon 1.8K ohm 1/6W, ±5%
R210	132A682	Res. Carbon 6.8K ohm 1/6W, ±5%
R212	132A222	Res. Carbon 2.2K ohm 1/6W, ±5%
R301	132A104	Res. Carbon 100K ohm 1/6W, ±5%
R302	132A101	Res. Carbon 100 ohm 1/6W, ±5%
R303	132A109	Res. Carbon 1 ohm 1/6W, ±5%
R304	132A270	Res. Carbon 27 ohm 1/6W, ±5%
R305	132A104	Res. Carbon 100K ohm 1/6W, ±5%
R306	132A103	Res. Carbon 10K ohm 1/6W, ±5%
R307	132A273	Res. Carbon 27K ohm 1/6W, ±5%
R308	132A562	Res. Carbon 5.6K ohm 1/6W, ±5%
R309	132A102	Res. Carbon 1K ohm 1/6W, ±5%
R310	132A473	Res. Carbon 47K ohm 1/6W, ±5%
R401	132A103	Res. Carbon 10K ohm 1/6W, ±5%
R402	132A104	Res. Carbon 100K ohm 1/6W, ±5%
R403	132A682	Res. Carbon 6.8K ohm 1/6W, ±5%
R404	132A682	Res. Carbon 6.8K ohm 1/6W, ±5%
R405	13B0223	Res. Metalized 22K ohm 1W, ±5%
R406	13B0223	Res. Metalized 22K ohm 1W, ±5%
R407	132A222	Res. Carbon 2.2K ohm 1/6W, ±5%
R408	13B0223	Res. Metalized 22K ohm 1W, ±5%
R409	13B0223	Res. Metalized 22K ohm 1W, ±5%

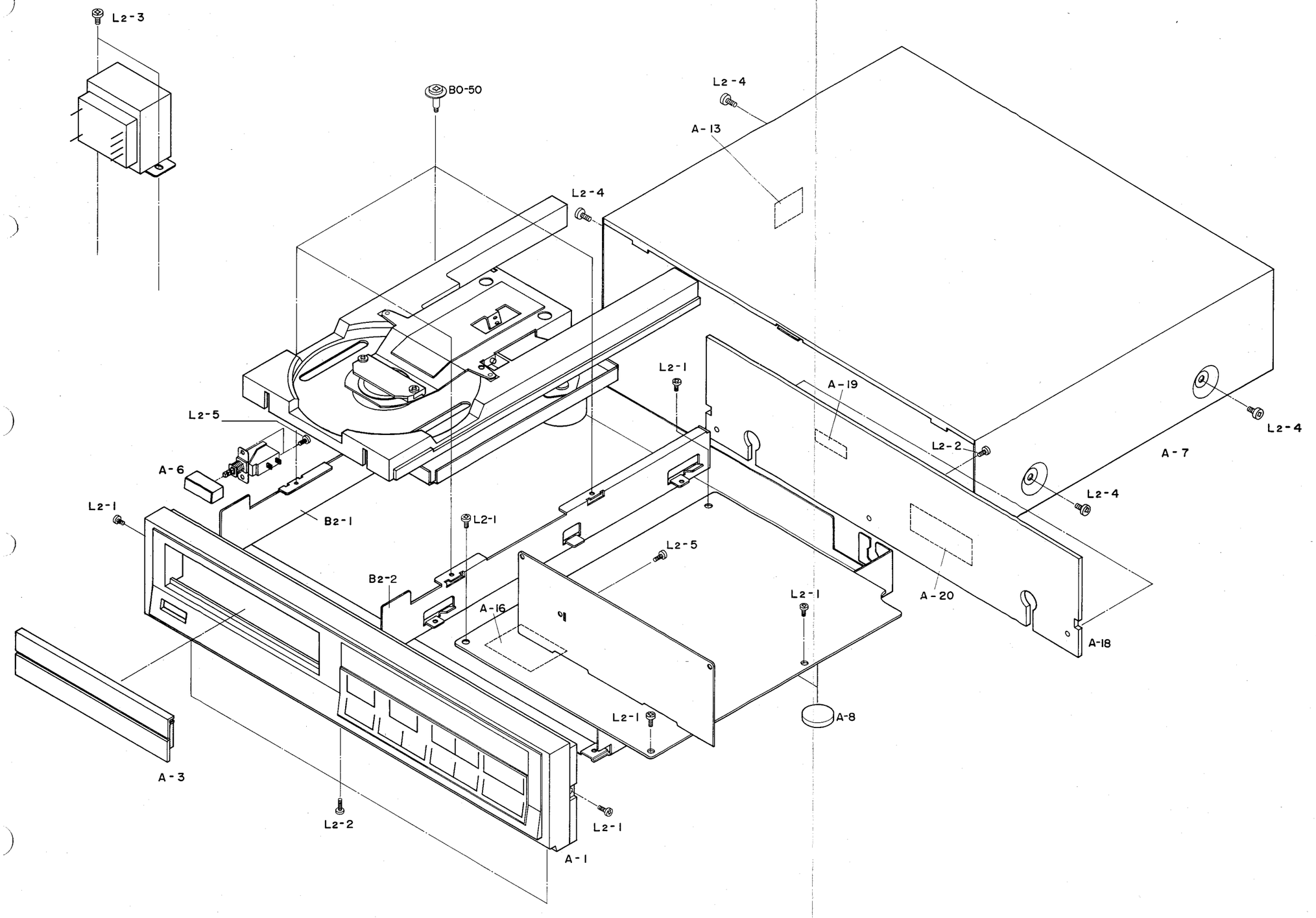
Ref. No.	Mfr. Part No.	Description		Ref. No.	Mfr. Part No.	Description	
R410	132A332	Res. Carbon 3.3K ohm 1/6W,	±5%	R540	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R411	132A154	Res. Carbon 150K ohm 1/6W,	±5%	R542	13B0223	Res. Metalized 22K ohm 1W,	±5%
R412	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R543	132A393	Res. Carbon 39K ohm 1/6W,	±5%
R413	132A223	Res. Carbon 22K ohm 1/6W,	±5%	R544	132A333	Res. Carbon 33K ohm 1/6W,	±5%
R414	132A821	Res. Carbon 820 ohm 1/6W,	±5%	R545	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R415	132A100	Res. Carbon 10 ohm 1/6W,	±5%	R546	132A222	Res. Carbon 2.2K ohm 1/6W,	±5%
R416	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R547	132A682	Res. Carbon 6.8K ohm 1/6W,	±5%
R417	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R548	132A560	Res. Carbon 56 ohm 1/6W,	±5%
R418	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R549	132A181	Res. Carbon 180 ohm 1/6W,	±5%
R419	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R551	132A223	Res. Carbon 22K ohm 1/6W,	±5%
R420	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R552	132A223	Res. Carbon 22K ohm 1/6W,	±5%
R421	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R553	132A224	Res. Carbon 220K ohm 1/6W,	±5%
R422	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R554	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R423	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R555	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R425	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R556	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R426	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R557	132A223	Res. Carbon 22K ohm 1/6W,	±5%
R427	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R558	132A822	Res. Carbon 8.2K ohm 1/6W,	±5%
R428	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R559	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R429	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R560	132A123	Res. Carbon 12K ohm 1/6W,	±5%
R430	132A105	Res. Carbon 1M ohm 1/6W,	±5%	R561	132A821	Res. Carbon 820 ohm 1/6W,	±5%
R501	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R562	132A821	Res. Carbon 820 ohm 1/6W,	±5%
R502	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R563	132A123	Res. Carbon 12K ohm 1/6W,	±5%
R503	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R564	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R504	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R565	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R506	132A159	Res. Carbon 1.5 ohm 1/6W,	±5%	R566	132A123	Res. Carbon 12K ohm 1/6W,	±5%
R507	132A393	Res. Carbon 39K ohm 1/6W,	±5%	R567	132A821	Res. Carbon 820 ohm 1/6W,	±5%
R508	132A272	Res. Carbon 2.7K ohm 1/6W,	±5%	R568	132A821	Res. Carbon 820 ohm 1/6W,	±5%
R509	132A273	Res. Carbon 27K ohm 1/6W,	±5%	R569	132A123	Res. Carbon 12K ohm 1/6W,	±5%
R510	132A564	Res. Carbon 560K ohm 1/6W,	±5%	R570	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R511	132A683	Res. Carbon 68K ohm 1/6W,	±5%	R571	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R512	132A564	Res. Carbon 560K ohm 1/6W,	±5%	R572	132A564	Res. Carbon 560K ohm 1/6W,	±5%
R513	132A104	Res. Carbon 100K ohm 1/6W,	±5%	R573	132A153	Res. Carbon 15K ohm 1/6W,	±5%
R514	132A104	Res. Carbon 100K ohm 1/6W,	±5%	R574	132A684	Res. Carbon 680K ohm 1/6W,	±5%
R515	132A273	Res. Carbon 27K ohm 1/6W,	±5%	R575	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R516	132A184	Res. Carbon 180K ohm 1/6W,	±5%	R576	132A184	Res. Carbon 180K ohm 1/6W,	±5%
R517	132A473	Res. Carbon 47K ohm 1/6W,	±5%	R577	132A472	Res. Carbon 4.7K ohm 1/6W,	±5%
R518	132A821	Res. Carbon 820 ohm 1/6W,	±5%	R578	132A392	Res. Carbon 3.9K ohm 1/6W,	±5%
R519	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R579	132A562	Res. Carbon 5.6K ohm 1/6W,	±5%
R520	132A684	Res. Carbon 680K ohm 1/6W,	±5%	R580	132A220	Res. Carbon 22 ohm 1/6W,	±5%
R521	132A183	Res. Carbon 18K ohm 1/6W,	±5%	R581	132A561	Res. Carbon 560 ohm 1/6W,	±5%
R522	132A122	Res. Carbon 1.2K ohm 1/6W,	±5%	R582	132A221	Res. Carbon 220 ohm 1/6W,	±5%
R523	132A391	Res. Carbon 390 ohm 1/6W,	±5%	R583	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R524	132A333	Res. Carbon 33K ohm 1/6W,	±5%	R584	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R525	132A184	Res. Carbon 180K ohm 1/6W,	±5%	R585	132A103	Res. Carbon 10K ohm 1/6W,	±5%
R526	132A221	Res. Carbon 220 ohm 1/6W,	±5%	R586	132A474	Res. Carbon 470K ohm 1/6W,	±5%
R527	132A183	Res. Carbon 18K ohm 1/6W,	±5%	R587	132A474	Res. Carbon 470K ohm 1/6W,	±5%
R528	132A684	Res. Carbon 680K ohm 1/6W,	±5%	R588	132A153	Res. Carbon 15K ohm 1/6W,	±5%
R529	132A684	Res. Carbon 680K ohm 1/6W,	±5%	R801	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R530	132A102	Res. Carbon 1K ohm 1/6W,	±5%	R802	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R531	132A562	Res. Carbon 5.6K ohm 1/6W,	±5%	R803	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R532	132A124	Res. Carbon 120K ohm 1/6W,	±5%	R804	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R533	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R805	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R534	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R806	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R535	132A103	Res. Carbon 10K ohm 1/6W,	±5%	R807	133A229	Res. Carbon 2.2 ohm 1/6W,	±5%
R536	132A222	Res. Carbon 2.2K ohm 1/6W,	±5%	R808	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R537	132A222	Res. Carbon 2.2K ohm 1/6W,	±5%	R809	132A471	Res. Carbon 470 ohm 1/6W,	±5%
R538	132A222	Res. Carbon 2.2K ohm 1/6W,	±5%	R810	132A183	Res. Carbon 18K ohm 1/6W,	±5%
R539	132A684	Res. Carbon 680K ohm 1/6W,	±5%	R811	132A223	Res. Carbon 22K ohm 1/6W,	±5%

Ref. No.	Mfr. Part No.	Description
R812	132A103	Res. Carbon 10K ohm 1/6W, ±5%
R813	133A100	Res. Carbon 10 ohm 1/6W, ±5%
R814	132A821	Res. Carbon 820 ohm 1/6W, ±5%
R815	132A471	Res. Carbon 470 ohm 1/6W, ±5%
R816	132A100	Res. Carbon 10 ohm 1/6W, ±5%
R817	132A821	Res. Carbon 820 ohm 1/6W, ±5%
R818	132A471	Res. Carbon 470 ohm 1/6W, ±5%
R819	132A561	Res. Carbon 560 ohm 1/6W, ±5%
R820	132A221	Res. Carbon 220 ohm 1/6W, ±5%
R821	132A394	Res. Carbon 390K ohm 1/6W, ±5%
R822	132A393	Res. Carbon 39K ohm 1/6W, ±5%
R823	132A474	Res. Carbon 470K ohm 1/6W, ±5%
R824	132A103	Res. Carbon 10K ohm 1/6W, ±5%
R825	132A474	Res. Carbon 470K ohm 1/6W, ±5%
R826	132A331	Res. Carbon 330 ohm 1/6W, ±5%
R827	132A102	Res. Carbon 1K ohm 1/6W, ±5%
R828	132A100	Res. Carbon 10 ohm 1/6W, ±5%
R829	132A100	Res. Carbon 10 ohm 1/6W, ±5%
R830	133A229	Res. Carbon 2.2 ohm 1/6W, ±5%
R831	132A102	Res. Carbon 1K ohm 1/6W, ±5%
	TRANSISTORS	
Q101	2SC2878	Transistor,
Q102	2SC2878	Transistor,
Q201	2SC2878	Transistor,
Q202	2SC2878	Transistor,
Q301	2SC1815S or 2SC1740	Transistor,
Q302	2SA1015 or 2SA933	Transistor,
Q402	2SA1015 or 2SA933	Transistor,
Q403	2SA1015 or 2SA933	Transistor,
Q404	2SA1015 or 2SA933	Transistor,
Q405	2SA1015 or 2SA933	Transistor,
Q406	2SA1015 or 2SA933	Transistor,
Q407	2SC1815S or 2SC1740	Transistor,
Q501	2SC1162C or 2SD1380	Transistor,
Q502	2SA715C or 2SB1009	Transistor,
Q503	2SC1162C or 2SD1380	Transistor,
Q504	2SA715C or 2SB1009	Transistor,
Q505	2SD1227M	Transistor,
Q506	2SB911M	Transistor,
Q507	2SD1227M	Transistor,
Q508	2SB911M	Transistor,
Q509	2SC1815S or 2SC1740	Transistor,
Q510	2SC380	Transistor,
Q511	2SC1815S or 2SC1740	Transistor,
Q512	2SC1815S or 2SC1740	Transistor,
Q801	2SC1815S or 2SC1740	Transistor,
Q802	2SA1015 or 2SA933	Transistor,
Q803	2SA1015 or 2SA933	Transistor,
Q804	2SA934	Transistor,
Q805	2SC2060	Transistor,
Q806	2SA934	Transistor,
Q807	2SC1815S or 2SC1740	Transistor,
Q808	2SA1015 or 2SA933	Transistor,
Q809	2SC2060	Transistor,
Q810	2SA1015 or 2SA933	Transistor,
	MISCELLANEOUS	
	1630282	RCA Pin Jack
JP1	1740127 or 1730871	Wire Mate 10P
JP2	1740127 or 1730871	Wire Mate 10P
	E3100-01	Connector Ass'y 4P
	E3100-02	Connector Ass'y 5P
	E3100-03	Connector Ass'y 6P
CN1	1730828	Connector Pin Headder
CN2	1730830	Connector Pin Headder
	E3100-04	Connector Ass'y 2P
CN3	1730929	Connector Pin Headder 6P
CN4	1730928	Connector Pin Headder 5P
CN5	1730927	Connector Pin Headder 4P
CN11	1730925	Connector Pin Headder 2P
TP1	1730925	Connector Pin Headder 2P
TP2	1730927	Connector Pin Headder 4P
TP3	1730925	Connector Pin Headder 2P
X401	1811194 or 1811101	Crystal
	1613291X	**Control PCB Ass'y**
	DIODES	
D701	1401265	LED, 7 segment
D702	1401265	LED, 7 segment
D703	1401266	LED, 7 segment
D704	1401266	LED, 7 segment
D705	LN810RP	LED,
D706	LN810RP	LED,
D707	LN810RP	LED,
D708	LN810RP	LED,
D710	LN810RP	LED,
	ICS	
IC405	14D0203	IC, Micro Computer

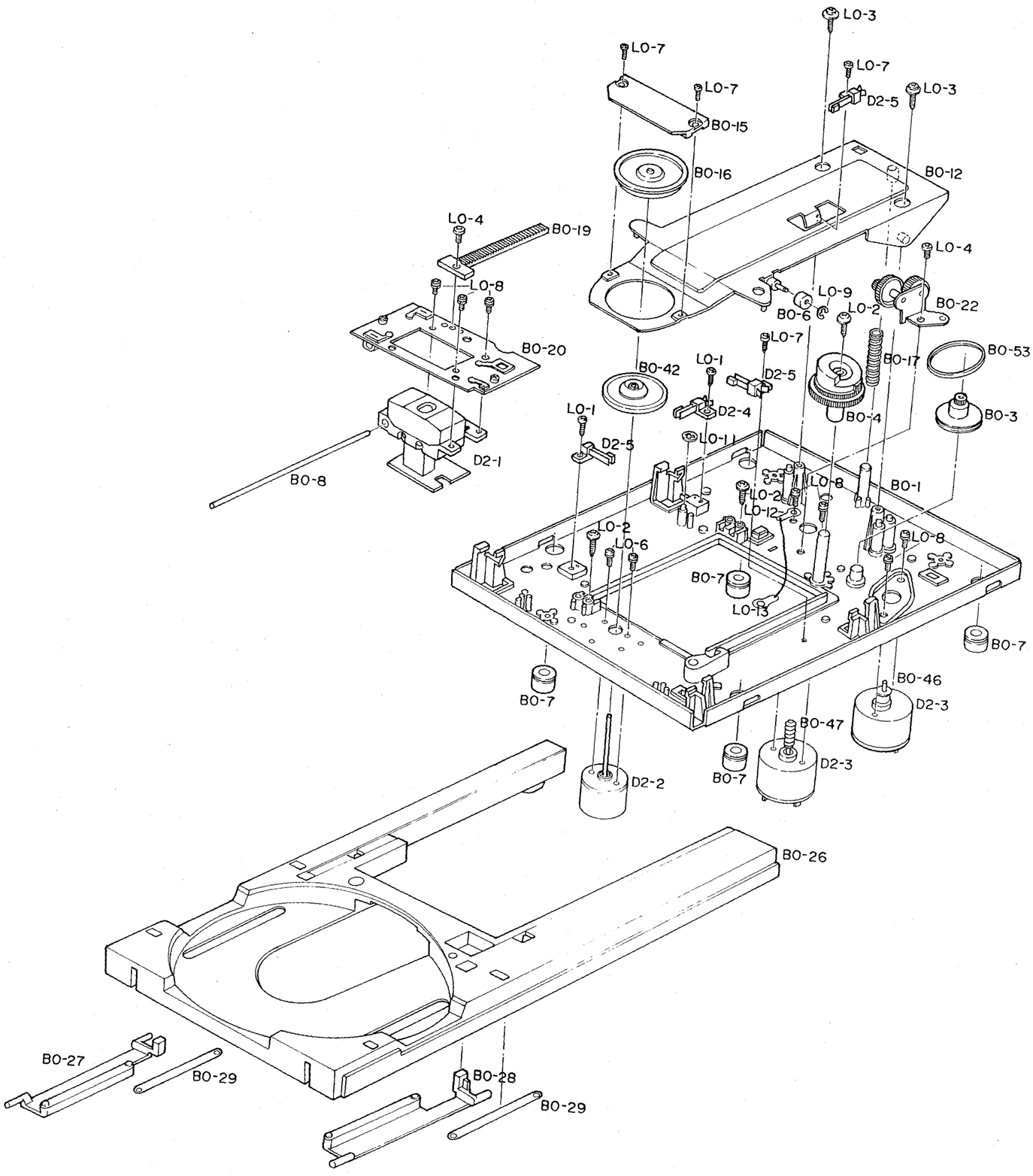
Ref. No.	Mfr. Part No.	Description
	RESISTORS	
R424	132A103	Res. Carbon 10K ohm 1/6W, ±5%
R701	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R702	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R703	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R704	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R705	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R711	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R712	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R713	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R714	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R715	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R716	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R717	132A330	Res. Carbon 33 ohm 1/6W, ±5%
R718	132A330	Res. Carbon 33 ohm 1/6W, ±5%
	SWITCHES	
SW701	1622964	Switch, Tact
SW702	1622964	Switch, Tact
SW703	1622964	Switch, Tact
SW704	1622964	Switch, Tact
SW705	1622964	Switch, Tact
SW706	1622964	Switch, Tact
SW707	1622964	Switch, Tact
SW708	1622964	Switch, Tact
SW709	1622964	Switch, Tact
SW710	1622964	Switch, Tact
SW711	1622964	Switch, Tact

Ref. No.	Mfr. Part No.	Description
	TRANSISTORS	
Q401	2SA1015 or 2SA933	Transistor,
	OTHERS	
	1790173	Cord Stopper
	1750816	Patch Cord
	1540009	Pick-up
M401	1640249	Motor, Disc
M402	1640233	Motor, Feed
M403	1640233	Motor, Load
SW401	1624113	Leaf Switch, Tray Open
SW402	1624118	Leaf Switch, Pick-up
SW403	1624118	Leaf Switch, Pick-up
SW404	1624118	Leaf Switch, Pick-up
	1613718-1X	**Power Supply PCB Ass'y**
T801	1150328	Power Transformer
	1750585	AC Cord
	E3101-06	Lead Wire Ass'y
	E3100-01	Connector Ass'y
	1790448	Fuse Holder
	1790134	Fuse 1A
	1790108	Fuse 500mA
	1613718-3X	**Power Switch PCB Ass'y**
C831	1220277	Spark Killer
SW801	1622845	Power Switch

EXPLODED VIEW (CABINET)



EXPLODED VIEW (DECK)



MECHANICAL PARTS LIST

Ref. No.	Mfr. Part No.	Description
A-1	21F7508X	Front Panel Ass'y
		Consists of following
	21F7508	Front Panel
	23F7175	Control Panel
	24D7226	LED Window
	24D7202	Filter
	24W9301	Double Faces Tape
	24W9302	Double Faces Tape
	24W9456	Double Faces Tape
	24W9442	Electrical Conduction Sheet L
	24W9443	Electrical Conduction Sheet R
A-3	21D7425X	Tray Ornament Ass'y
		Consists of following
	21D7425	Tray Ornament
	23D7056	Panel, Tray Ornament
A-6	21N9337	Button, Power
A-7	23C7504	Cabinet
A-18	24C7299X	Rear Panel Ass'y
		Consists of following
	24C7299	Rear Panel
	24L7906	Serial No. Label
	24L8258	IEC Label
A-29	24L8257	IEC Caution Label
B-1	23C7527X	Chassis Ass'y
		Consists of following
	23C7527	Chassis
	21W8032	Foot
	24L8291	Lock Instruction Label
B-2	23X9264	Bracket
B-3	23X9258	Bracket Small
B-5	24W9483	Holder, LED (7 seg Large)
B-6	24W9484	Holder, LED (7 seg Small)
B-7	21W8044	Holder, LED Indicator
B-9	24W9460	Washer, 0.5t
B-10	24W9476	Washer 1t
B-11	24T7504	Mat for Chuck Arm
L2-1	GFMP206	Screw, P-Tight Pan Head M2x6
L2-2	GBMP306	Screw, P-Tight Bind Head M3x6
L2-3	GBMS306	Screw, S-Tight Bind Head M3x6
L2-4	GBKS306	Screw, S-Tight Bind Head M3x6
L2-5	GFKS306	Screw, S-Tight Pan Head M3x6
L2-6	GCKP310	Screw, P-Tight Pan Head M3x10
L2-7	GBMS406	Screw, S-Tight Bind Head M4x6
L2-8	WBU4085	Washer M4
L2-9	HE03015	Lug, Ground M3
L2-10	HHR2030	Eyelet 2x3

DECK

B0-1	21S0016X	Main Chassis Ass'y
		Consists of following
	21S0016	Main Chassis
	23S7680	Plate Chassis

Ref. No.	Mfr. Part No.	Description
B0-3	21W8026	Pulley
B0-4	21W8025	Cam Gear
B0-6	21W7963	Guide Roller
B0-7	21W8040	Cushion
B0-8	25W8885	Guide Shaft
B0-12	23X9246X	Chuck Arm Ass'y
		Consists of following
	23X9246D	Chuck Arm
	25W8852	Boss (B)
	25W8886	Stud
	25W8880	Chuck Arm Stud
	25W8888	Stud A
	WSM9066	Spring Washer
B0-15	21W7966	Chuck Holder
B0-16	21W7965X	Chuck Disc Ass'y
		Consists of following
	21W7965	Chuck Disc
	24W9473	Cloth
B0-17	26W8001	Spring
B0-19	21W8030	Lack Gear
B0-20	21W8031	Pick up Bracket
B0-21	23X9248	Pick up Bracket A
B0-22	23X9167X	Gear Bracket Ass'y
		Consists of following
	23X9167	Gear Bracket
	21W7959	Worm Wheel
	21W7960	16 Gear
	25W8847	16 Gear Shaft
	25W8846	Worm Wheel Shaft
B0-26	21W7967G	Tray
B0-27	21W7968X	Disc Holder Ass'y Left
		Consists of following
	21W7968	Disc Holder Left
	21W7970	Rubber Bush
B0-28	21W7969X	Disc Holder Ass'y Right
		Consists of following
	21W7969	Disc Holder Right
	21W7970	Rubber Bush
B0-29	23X9162A	Spring Plate
B0-42	21W8018	Turn Table
B0-46	21W8027	Small Pulley
B0-47	21W7961	Warm Gear
B0-50	23X9209	Damper Screw
B0-53	21V7131	Belt
B0-59	24W9460	Washer
L0-1	GPKP905	Screw, P-Tight Pan Head M2.6 x 5
L0-2	GFMP306	Screw, P-Tight Cap M3 x 6
L0-3	23X9251	Screw, P-Tight Franged M3 x 8
L0-4	GBMS306	Screw, S-Tight Bind Head M3 x 6
L0-6	CPM3205	Screw, Sems Pan Head M2 x 5
L0-7	GBKS905	Screw, S-Tight Pan Head M2.6 x 5
L0-8	CPK3905	Screw, Sems Pan Head M2.6 x 5
L0-9	EEU0020	E-Ring 2mm dia.
L0-11	WTS3083	CS Washer 3mm dia.
L0-12	HE02612	Lug, Ground 2.6mm dia.
L0-13	HE04117	Lug, Ground 4.1mm dia.